# MODEL AIRPLANE NEWS

9th Year of Publication

JUNE 1938

20¢


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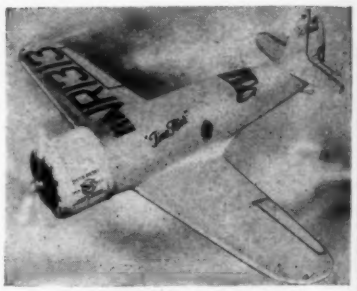

36" TIME FLIES $2.00 Postpaid

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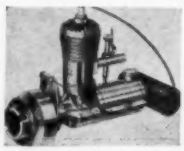

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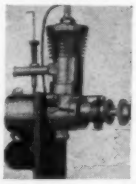

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| Cement, clear dope or | | Bamboo parchment white, red, yellow | .04 |

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*Free prop. oil, and necessary batteries with all small motors*

Build yourself a gas job that you can handle. These motors are all rated 1/6 h.p. and will fly a model from 30" to 60" which makes it a simple matter on space. These are real precision jobs that start easily and run perfectly. To really enjoy gas model flying get a small motor and you will find added satisfaction in flying a model that's easy to handle.

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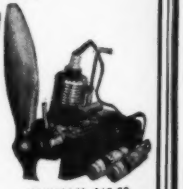
CONDOR $18.50



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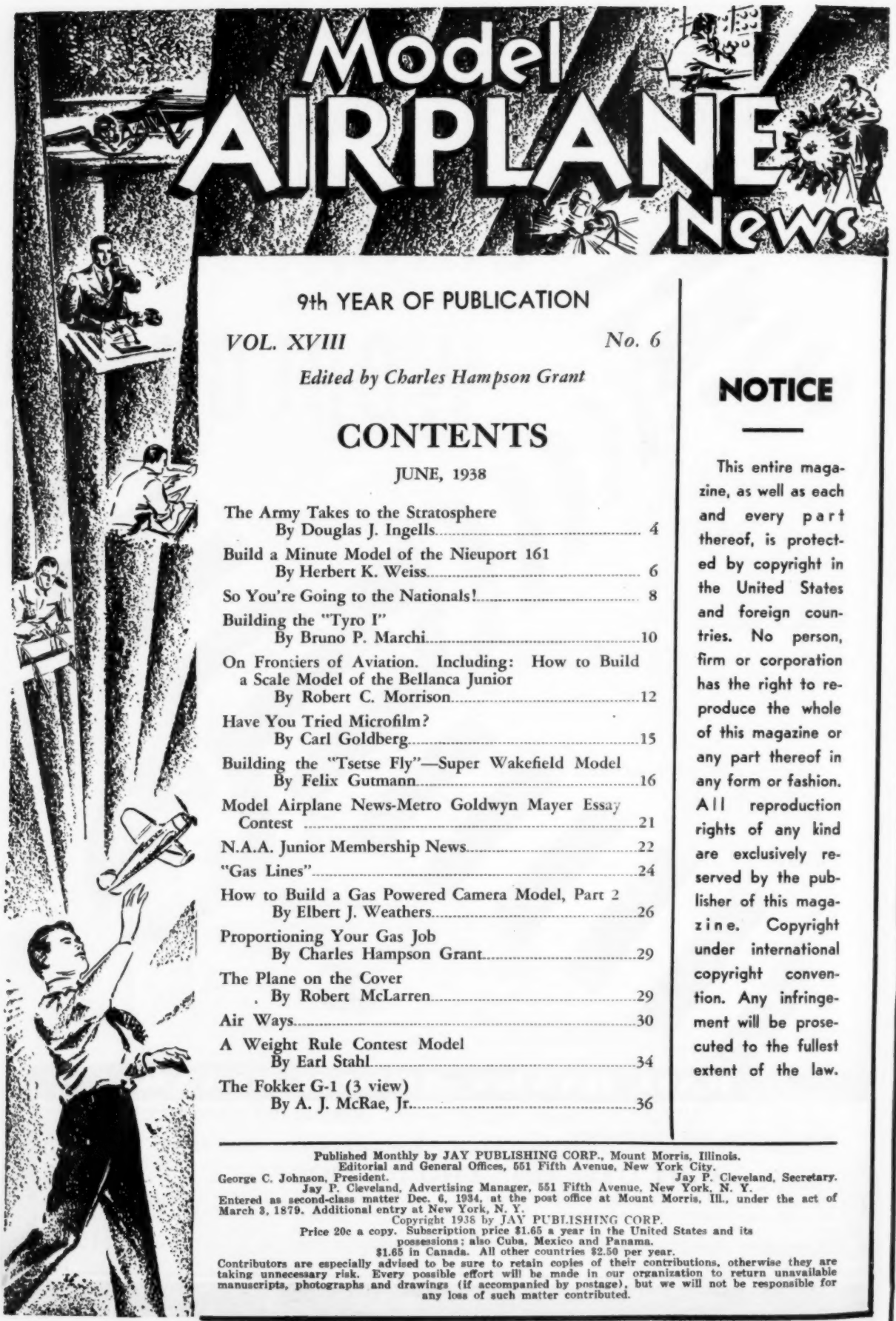


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## NOTICE



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# The Army Takes To The Stratosphere

## Details of Startling New Developments That Are Taking Place in the Struggle to Attain High Speed Transportation Through the Stratosphere.

By D. J. INGELLS

Photographs by courtesy of U. S. Army Air Corps

The Army's new strato-plane in flight above the clouds, Wright field, Dayton, Ohio.

FROM Chanute Field to Dayton in thirty-eight minutes!

That's what the new army strato-plane did not long ago in a routine test flight with four aboard. At a height of 21,000 feet the army's high altitude laboratory plane covered the 220 mile distance in record breaking time.

Recently purchased for experimental purposes by the Army Air Corps and brought to Wright Field in Dayton for testing, is the new Lockheed sub-stratosphere plane. Similar to the Lockheed Electra but with a re-designed fuselage, its outstanding feature is the "sealed cabin" which has proved to be a great advancement in stratosphere flying.

In the past it has been necessary, in order to attain any great height, to wear oxygen masks and other paraphernalia which would permit normal breathing. The "sealed cabin" of this new plane does away with this inconvenience and permits more freedom of movement at high altitudes, thus making way for more exact research.

When Capt. A. H. Johnson, Capt. Turner A. Simms, Jr., Maj. Frank R. Reed and Capt. Harry G. Armstrong stepped from the cabin of the plane after their flight from Chanute Field they wore clothes which might be seen on any individual stepping from a commercial airliner. They had no clumsy garments or equipment to hinder them in making important tests while flying nearly five miles above the earth. This was made possible by the pressure cabin in the sub-stratosphere ship which is equipped to maintain within it atmospheric conditions corresponding to sea-level altitudes even though the plane may be cruising miles in the air.

At an altitude of 25,000 feet the atmosphere in the cabin is supercharged to correspond to an altitude of only 12,000 feet, the average height at which pilot or passenger would experience no discomfort. But if an individual were flying at 25,000 feet in an ordinary airplane the use of oxygen would be required, or one would suffer discomfort and actual physical harm.

The Army Air Corps' strato-plane is not intended to establish records, but rather, it is to be solely an experimental laboratory for the many new items of equipment and engineering practices involved in high-altitude flying for both military and commercial airplanes of today.

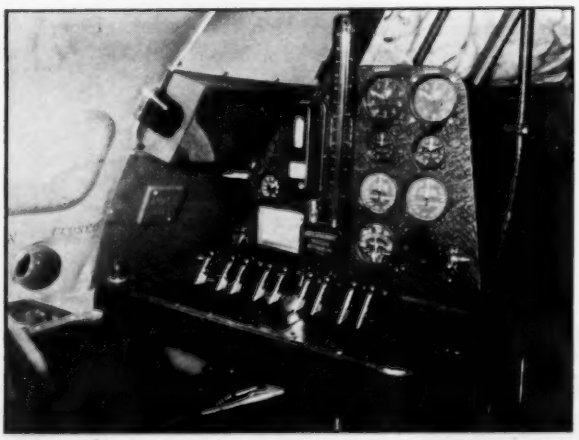
Flying in the stratosphere or the sub-stratosphere is not a new venture for the Army Air Corps. Experiments have been carried on for many years in high altitude flying. But this new plane brings about a revolutionized period of experimentation.

Many times in previous years army pilots have ascended to altitudes which established world records, but these flights were purposely record breaking attempts and they resulted in little scientific study and research. Now with its new strato-plane the army hopes to uncover some of the secrets which the sub-stratosphere holds.

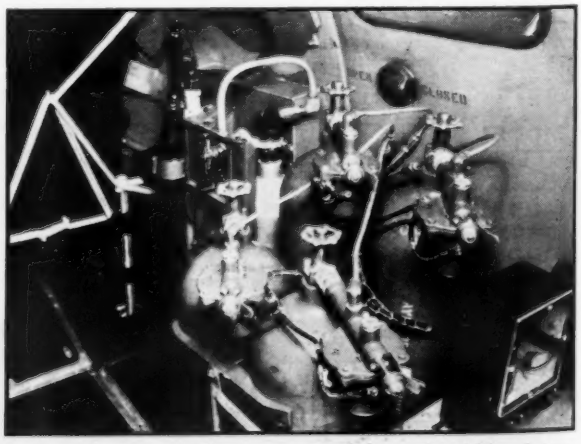
Twice Wright Field officers have smashed world records in the upper stratosphere, ascending to heights above 70,000 feet in the *Explorer I* and the *Explorer II*, both stratosphere balloons. The last attempt, on Nov. 11, 1935, carried Maj. Albert Stevens and Capt. Orvil Anderson to a height of 72,394.7 ft. and brought back many important discoveries, especially those regarding the cosmic rays.

But the sub-stratosphere, that layer of air between 15,000 and 40,000 feet in which the airliners of tomorrow may wing their way across the continent, still holds many unknown secrets. The army is not interested only from a military standpoint, it is more interested from the standpoint of aeronautical progress.

There is little doubt that higher speeds can be obtained in the sub-stratosphere, that is a proven fact. For this reason the Army is making its experimental flights into the higher altitudes. Engineers and medical officers at Wright Field want to

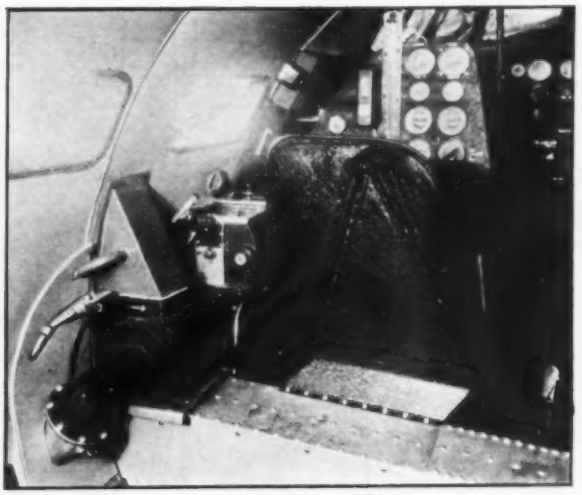


Pressure cabin operator's instrument panel and control board; an important factor to those who fly in the stratosphere.



In case of emergency these oxygen and fire extinguishing instruments are always on hand and in good order.

Looking forward into pilot's compartment, showing the center control pedestal and dashboard controls.



Pressure cabin operator's seat with control panel and automatic cabin air discharge valve mechanism.

know the effects that conditions of sub-stratosphere flying have on the individual. They seek to answer questions regarding the practical use of sub-stratosphere flying. How fast can a plane fly in the sub-stratosphere? Is the "sealed cabin" safe under the strain of the actual flying? What will be the benefits? Around the theories and solutions to these questions, derived from army reports, will rest the future of stratosphere flying.

The new stratosphere plane may supply these answers. In itself it is very similar to the plane which Amelia Earhart used on her last attempted flight across the Pacific, with the exception, of course, of its re-designed fuselage.

The crew is inclosed in a pressure-tight envelope and has many operations to perform. These operations involve encountering temperatures which differ frequently, and also heavy ice conditions and cloud formations. There must be ventilation and proper air pressure at all times, and ice and fog must be kept off the windows. These are the dangers of stratosphere flying. They make it dangerous and hazardous. All of this must be done as effectively as if the plane were an ordinary craft flying at low or normal altitudes.

The ship is built of the semi-monocoque type, the fuselage being circular in cross section. The walls of the fuselage are of the conventional aluminum alloy construction with the exception that they are of much greater thickness than those of the standard Lockheed Electra airplane. They are designed to withstand a pressure of fifteen pounds per square inch. Air tight doors close the fuselage, keeping it free from any atmospheric disturbances.

The entire fuselage is designed as a pressure compartment with the exception of the section immediately forward of the tail surfaces. This section allows flexibility in the structure which provides for temperature expansion and contraction encountered in the sub-stratosphere. At times the temperature differences will vary between 54 degrees below zero and 100 degrees above zero Fahrenheit.

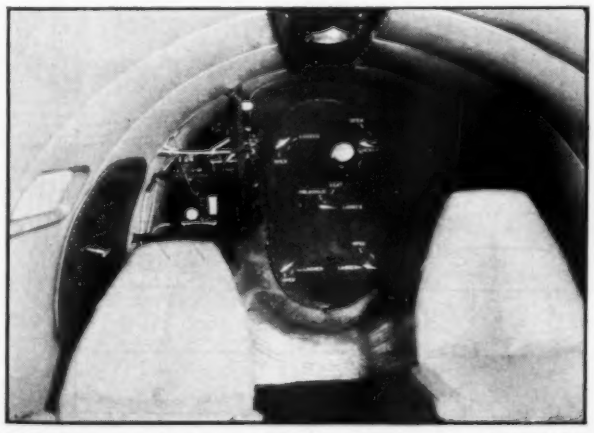
The plane carries a crew of six; consisting of one pilot, one co-pilot, one radio and pressure compartment operator, and three pressure compartment observers. The pilot and co-pilot are seated side by side in the forward compartment of the plane. Immediately behind them, centrally located, is the operator's stations. Within his reach are all the controls for regulating and conditioning the cabin atmosphere. He has many instruments to attend to; cabin pressure valves, pressure safety valves, oxygen supply valves, and emergency valves. All of these must be under his constant eye in addition to numerous other instruments which record pressure in feet altitude, cabin temperatures, humidity, outside temperatures, altitude and a thousand different things.

There is also a hot and cold air supply. The fuselage is never allowed to get colder than fifty degrees or warmer than seventy degrees Fahrenheit. This provides "normal" conditions for the occupants at all times. A discharge valve provides that the change in cabin pressure shall not be more than five per cent of the barometric pressure at altitudes greater than 15,000 feet.

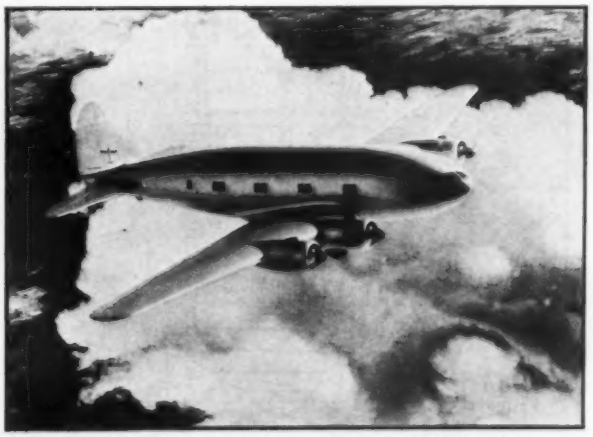
Five rectangular windows with 5 to 12 inch openings are placed on each side of the fuselage, thus giving an advantageous vision to the pilots. There are two doors, one on the left side of the fuselage, the other in the top. The latter is to be used as an emergency exit only.

On all flights there is carried an emergency supply of oxygen which is to be

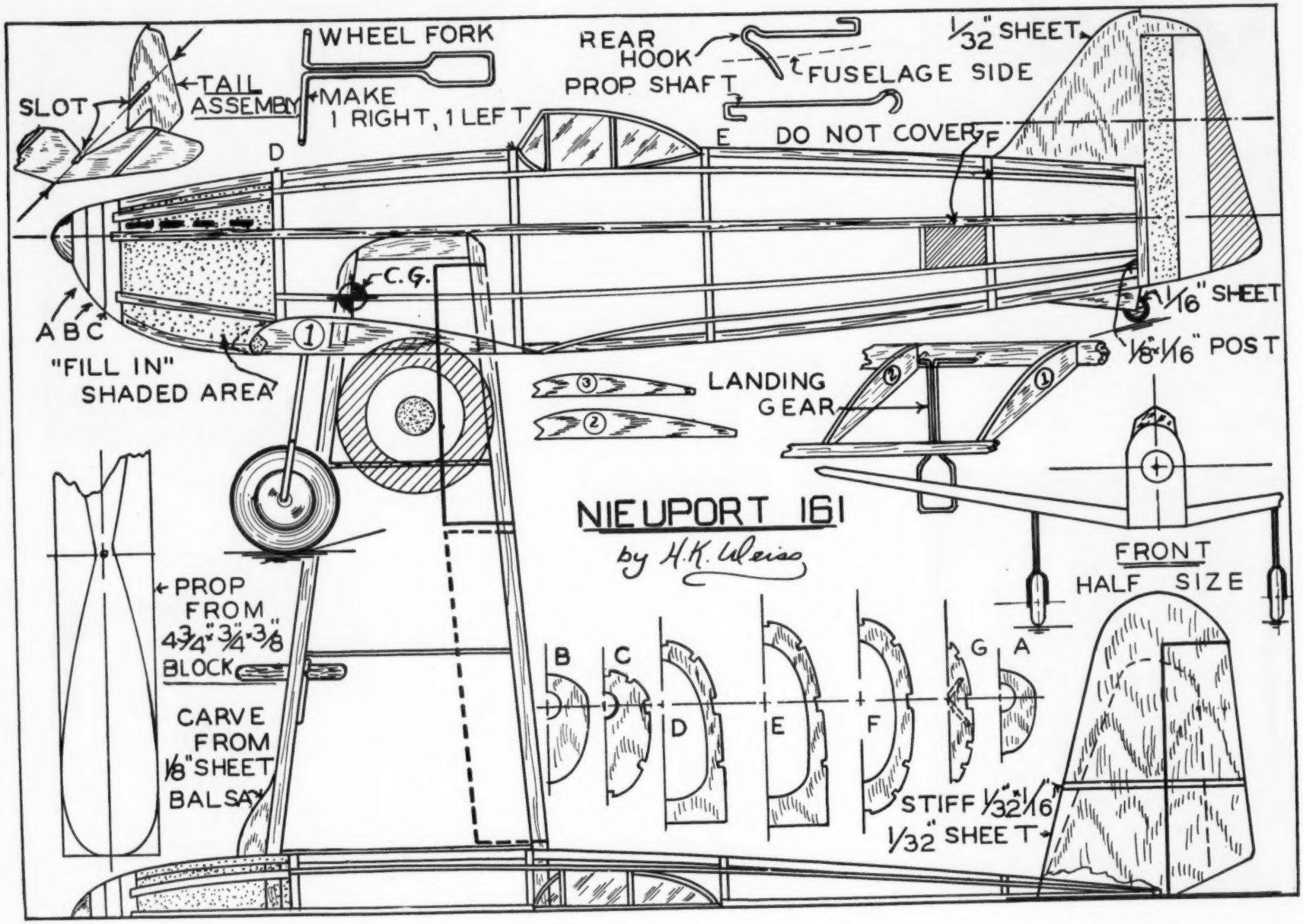
*(Continued on page 48)*

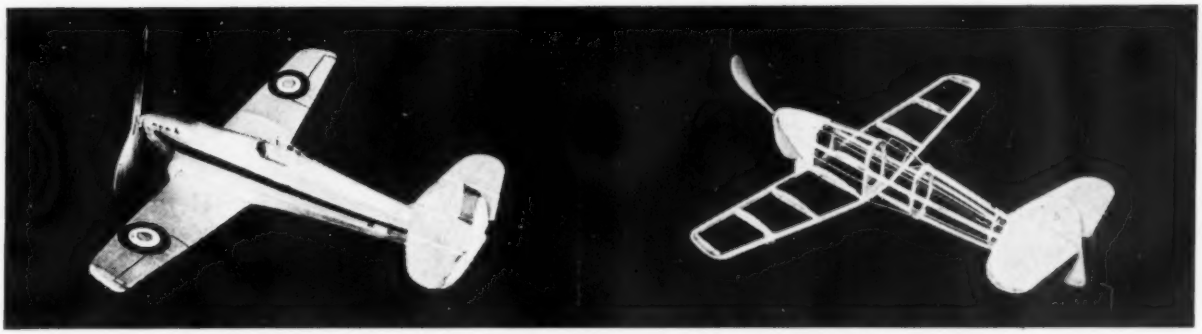


Looking rearward, showing recording instruments and air tight door. The door to the outside is similar to this one.



How the new Boeing Stratoliners will look in flight when completed. Their equipment will be similar to that of the Army plane.


WHEEL FORK
MAKE
1 RIGHT, 1 LEFT
REAR
HOOK
PROP SHAFT
FUSELAGE SIDE
1/32" SHEET
SLOT
TAIL
ASSEMBLY
D
E
DO NOT COVER
F
C.G.
A B C
"FILL IN"
SHADED AREA
1/16" SHEET
1/8"x1/16" POST
LANDING
GEAR
NIEUPORT 161
by H.K. Weiss
FRONT
HALF SIZE
PROP
FROM
4 3/4" 3" 3/4" 3/8"
BLOCK
CARVE
FROM
1/8" SHEET
BALSA
B
C
D
E
F
G
A
STIFF 1/32"x1/16"
1/32" SHEET



The plane before and after covering. Note the simple construction but realistic appearance.

# Build A Minute Model of the Nieuport 161

## A Realistic Plane Easily Built by the Novice in Half the Time Required to Build the Regular Type of Flying Scale Model

By HERBERT K. WEISS

ONLY a few years ago two hundred mile an hour fighting planes were considered the ultra-experimental ships of any service. Today there is hardly a military air service in the world without several types of fighters in the 300 mile an hour class.

France's latest is the Loire-Nieuport 161, which hits 480 km. per hour at 13,000 feet, or almost 300 miles per hour. Of all metal construction, the 161 is powered by an 860 horsepower Hispano Suiza Ycrs "moteur cannon."

While of essentially simple construction, the model retains the trim lines of the original, and its flying ability reflects the high performance of its big brother.

### Wing

The wing is made in one piece. Cut out two of each size ribs from 1/32" sheet balsa. The leading edge is ⅛" square balsa shaped to correct section after assembly, and the trailing edge is ⅛" x 1/16" balsa. After the frame has been assembled and cemented, put blocks under the wing tips to give one inch of dihedral at each tip. The wing tips are cut from 1/16" sheet to fit.

### Fuselage

Cut two halves of each bulkhead and cement the halves together. Bulkheads A, B and C are ⅛" balsa, and D, E, F and G are 1/16" balsa. Cement bulkheads D and E to the wing center section. Then add the two 1/16" square side stringers, and to these add the rest of the bulkheads and the tail post. Add the remaining stringers. The top and bottom stringers are 1/16" square and the rest 1/32" square bamboo. Fill in the nose with scrap balsa and sand smooth.

### Tail Surfaces

Trace the rudder and stabilizer outlines on 1/32" sheet balsa and cut them out. Sand smooth, cut slots as shown to permit the parts to lock together, and cement them together. Note the 1/32" x 1/16" stiffener on top of each side of the stabilizer.

### Propeller

Carve the propeller from a block of hard balsa. A ready formed prop may be used

The little plane has a fine climb. Here it is in full flight.

but is likely to prove unsatisfactory because it is too high pitched for this type of model.

### Landing Gear

Bend two forks, put the wheels in place and cement the assembly to the leading edge as shown. Thin hardwood wheels are preferable. All wire parts are No. 14 wire (1/32" steel may be used). Bend a rear hook and prop shaft. Note that part of the rear hook projects out of the rubber installation opening to facilitate handling. Two wire cross-braces strengthen the bulkhead G and prevent the hook from pulling through.

### Covering

Cover carefully with silver tissue. Spray with water and allow to dry. Add tail wheel. Tail insignia is, reading from front to back, blue, white and red stripes. Wings' circles are red, white and blue, red circle outermost.

### Flying

Dope nose and prop or add lead until center of gravity is at position shown on plan. Test for location of the C.G. by balancing on finger tips. Vertical position is not important but the model must *not* balance in *back* of the position shown or flights will be unsatisfactory. Use two strands of ⅛" flat rubber. Adjust for flying by warping elevators up or down. Because of its small size the model is tricky to adjust, but once its tendencies are learned it is a steady flyer.

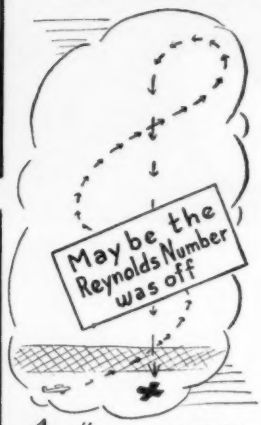
**We will appreciate hearing from model builders, whether or not they like this type of scale model more than the more elaborate and detailed type published in previous issues of MODEL AIRPLANE NEWS.**

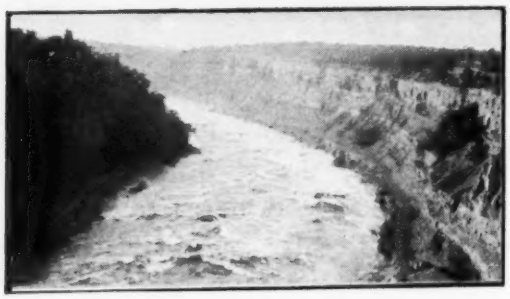
The large propeller provides a big flight for a small plane.

# So You're To The

## Here's a Preview

1 ALWAYS BUILD ENTRIES LONG BEFORE MEET

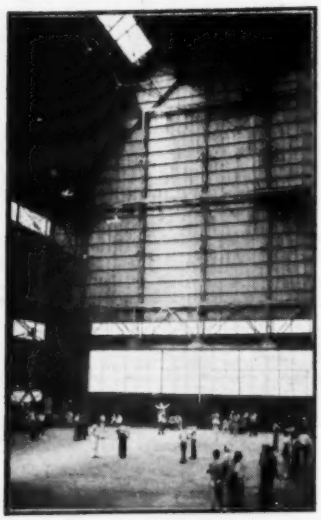


2 "OH, FOR A HYDRO

3 ONLY 999 MORE MILES TO DETROIT

"Have you seen the DAILY BLURB?"



4 INDOOR FLYING AT BLIMP HANGER

5 VERNON BOEHLE '37 GAS ENTRY

FAMOUS LAST WORDS "Ill have this motor running in just a moment, sir."

6 ALL THE WAY FROM ST. JOE MO!

LUNCH TIME AT OUTDOOR EVENT 7

NOW that the 1938 National Model Airplane Battle has been announced for July 6th through 9th, and Detroit designated once again as the "fray front," aeromodelers everywhere are formulating their plans to attend.

So you're going, too? Then come along on an automobile trip to the big "brawl." These accompanying photos might have been taken by any one of the hundreds of groups who competed in the '36 or '37 championship contests. Actually, the pictures were snapped by Jordan Marsh Junior Aviation League delegates.

Frowning in picture No. 1 is Bruno Marchi shown with some of his fellow J.A.L. members. Bruno is the builder behind that sheaf of sheet balsa. In conventional manner, Marchi is attempting to complete his Wakefield entry at an over-night camp. P.S.: He had reason to frown, he didn't finish the model—it almost finished him.

Niagara River gorge in No. 2 was snapped from the lower Falls bridge by the Boston representatives as they agreed "What a swell spot for an amphibion flight!"

No. 3. Hitching up the "Susie-Q" to the League limousine, with Detroit just around the corner.

In only four moves we're at Detroit and the Nationals. Here's the Grosse Ile blimp hanger in which the '37 indoor events were run off.

No. 5. Vernon Boehle and his last year's gas entry attracted considerable attention.

No. 6. Also attracting much attention was this "Model T" which carried a pair of intrepid (and we mean "intrepid") entrants in from St. Joseph, Missouri. Busses used to transport contestants to Wayne County Airport are in the background.

A small section of the vast outdoor flying space is shown in No. 7. Builders still remember the accompanying crunch

# Going Nationals

## Of Modelers' Trek

that came when a few poorly adjusted commercials played tag with those soft, velvety runways!

Picture No. 8, showing a portion of the interior of Wayne County airport hanger, is historically valuable for several reasons . . . first, because of the Stout Skycar in the background and secondly, for the splendid examples of early American jalopies (ancient autos to you, sonny) which conveyed contestants to the scene of festivities.

No. 9. Jim Cahill's winning Moffet entry with its sensational one-bladed prop. This is one of the two photos taken of the craft before it flew from sight on an official flight.

Slickest gas model on the field is shown in No. 10. A scale model of the Stinson with an amazingly fine finish.

From the archives is presented picture 11 showing Carl (In Old Chicago) Goldberg measuring fuel allowances for the gas event. Carl is reassuring the anxious builder that the allotment is "good to the last drop."

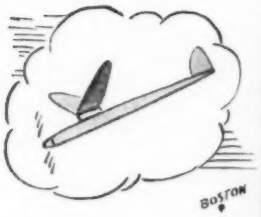
No. 12 speaks for itself. The number of gas models at the '36 contest far exceeded even the most optimistic expectations.

Nearing the end of the meet, now. In No. 13 indoor fliers are preparing their entries for official flights in the blimp hanger.

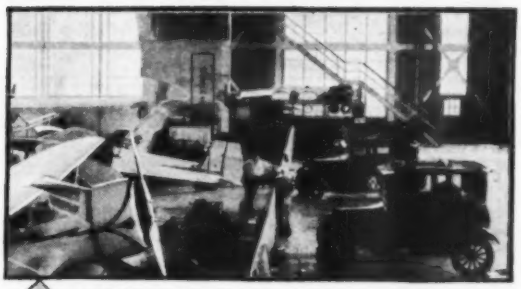
Finally the tired but triumphant Jordan Marsh Junior Aviation League tourists once again hitch up the "Susie-Q"—this time after shattering two national records at Akron. Both Marchi and Ralph Brown set a new mark in the vast airdock, each flying his one remaining undamaged model.

The few casual comments that may be noted are "old stuff" to past National contestants. You, too, may be saying the same if we meet up with you in Detroit during the early part of July.

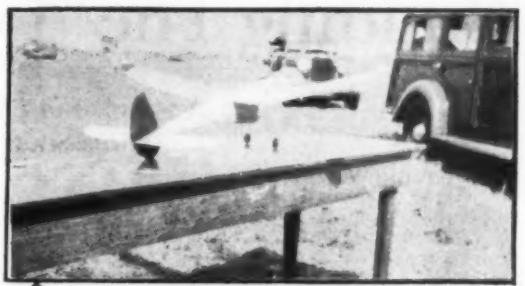
Here's hoping!





8 CONTESTANTS' CARS —WAYNE COUNTY AIRPORT HANGER



9 JIM CAHILL'S TOP PLACE MOFFET CONTEST SHIP

10 "AIN'T SHE SWEET?"

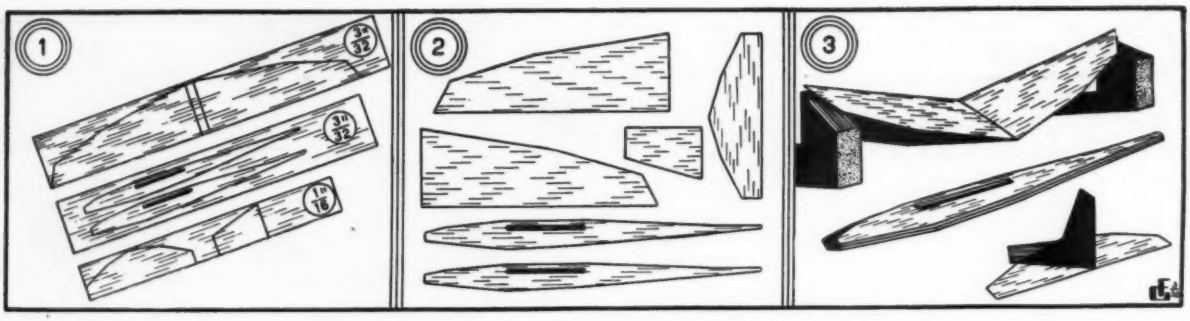
11 CARL GOLDBERG METES OUT ALLOTED FUEL

12 OPENING RUSH AT JUDGES' TABLE TO CHECK GAS MODELS

DETROIT OR BUST! BUSTED

13 INDOOR FLYERS UNPACK

BOSTON GROUP AT AKRON AIRDOCK 14




# Building The "Tyro I"—Outdoor Glider

## A Simple But Efficient Plane That Anyone May Build in a Short Time at a Cost of a Few Cents

By BRUNO P. MARCHI

"OH, IT zips through the air with the greatest of speed . . ."

Speaking, of course, of the "Tyro I"; which embodies many features found only in high performance contest types, yet a glider which can be made in a very short time.

Glance at the plans and note the simple, rugged construction and the many short-cuts to quicker completion.

It is the author's contention that any beginning modeler can build this craft. To prove his point, plans of the "Tyro I" were given to a representative group of inexperienced fliers and all produced fine flying gliders.

Although following the accepted lines for advanced contest entries, the "Tyro I" is easy to build because of its flat wings, straight edges on wing and tail surfaces and its unique wing setting arrangement.

Required to build this model are approximately eight cents worth of sheet balsa and glue in addition to carbon paper, cardboard, sandpaper, modeling clay, single edge razor blade, pencil and ruler.

Yet when finished, ready to perform with its proper nose weight of modeling clay, this glider is big enough and heavy enough to enter either an N.A.A. sanctioned outdoor event for Class B hand-launched gliders or any official outdoor glider meet.

### Construction

First read this brief article carefully. Then secure some cardboard of the same thickness found in suit boxes, and, using carbon paper, trace the fuselage side, wing and tail surfaces on the cardboard.

Next step is to carefully cut out the cardboard copies of these parts which will then become templates. Make two outlines of the wing panel and fuselage side on 3/32" inch, medium hard, three inches wide sheet balsa. Outline the stabilizer and rudder on 1/16" medium hard, two inches wide sheet balsa. These steps are illustrated in diagram No. 1.

With a single edge razor blade (to save shredding the fingers), cut out the glider's parts as shown in diagram No. 2, using care when cutting out the wing slots in the two fuselage sides.

Final step in preparing the various parts for assembly is beveling each wing panel where they are to be joined at the angle shown in enlarged "Section A-C" on the plan. Thus, when both wings have a dihedral angle of two inches their centers fit together snugly.

Sandpaper the sharp edges of the wing and tail surfaces to produce rounded leading and trailing edges and tips.

Here is where we let you in on a secret:

"Precoat all joints to make 'em stronger,
And gliders stay together longer."

Precoating means applying cement to sections which will later be glued together. This operation provides a foundation for the final joining, by filling up the pores in the wood. So give a preliminary coating of cement to the wing centers, the sides of the fuselages where they are to be joined together, the stabilizer slot on each fuselage side, the bottom of the rudder and the top of the stabilizer. These areas are all shown on the plan.

After permitting a second precoating of cement to dry thoroughly, the wing panels are joined with two inches of dihedral on each side as shown, or four inches on one panel when the other panel is flat on the work board.

Glue the fuselage sides together and cement the rudder on top of the stabilizer, making certain the rudder does not lean to one side or is off-center, diagram No. 3.

After the wing panels are glued together, apply this coating of cement along the top and bottom of the joint. Do this several times, spreading a thin skin or coating of glue along both sides of each panel with a finger or glue stick covering the area indicated on the drawing.

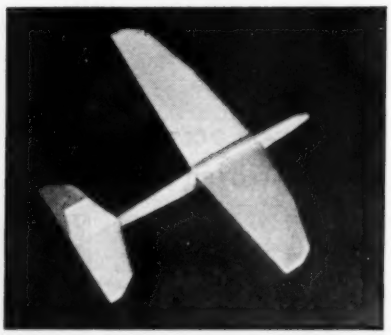
The final assembly task is to slip the wing through the fuselage slot with the straight edge to the rear, so as to form the trailing edge. Should it be necessary to enlarge the wing slot slightly, don't make the opening so large that the wing will fit too loosely. Glue the stabilizer and rudder tail group in place in the fuselage slot.

*(Continued on page 56)*

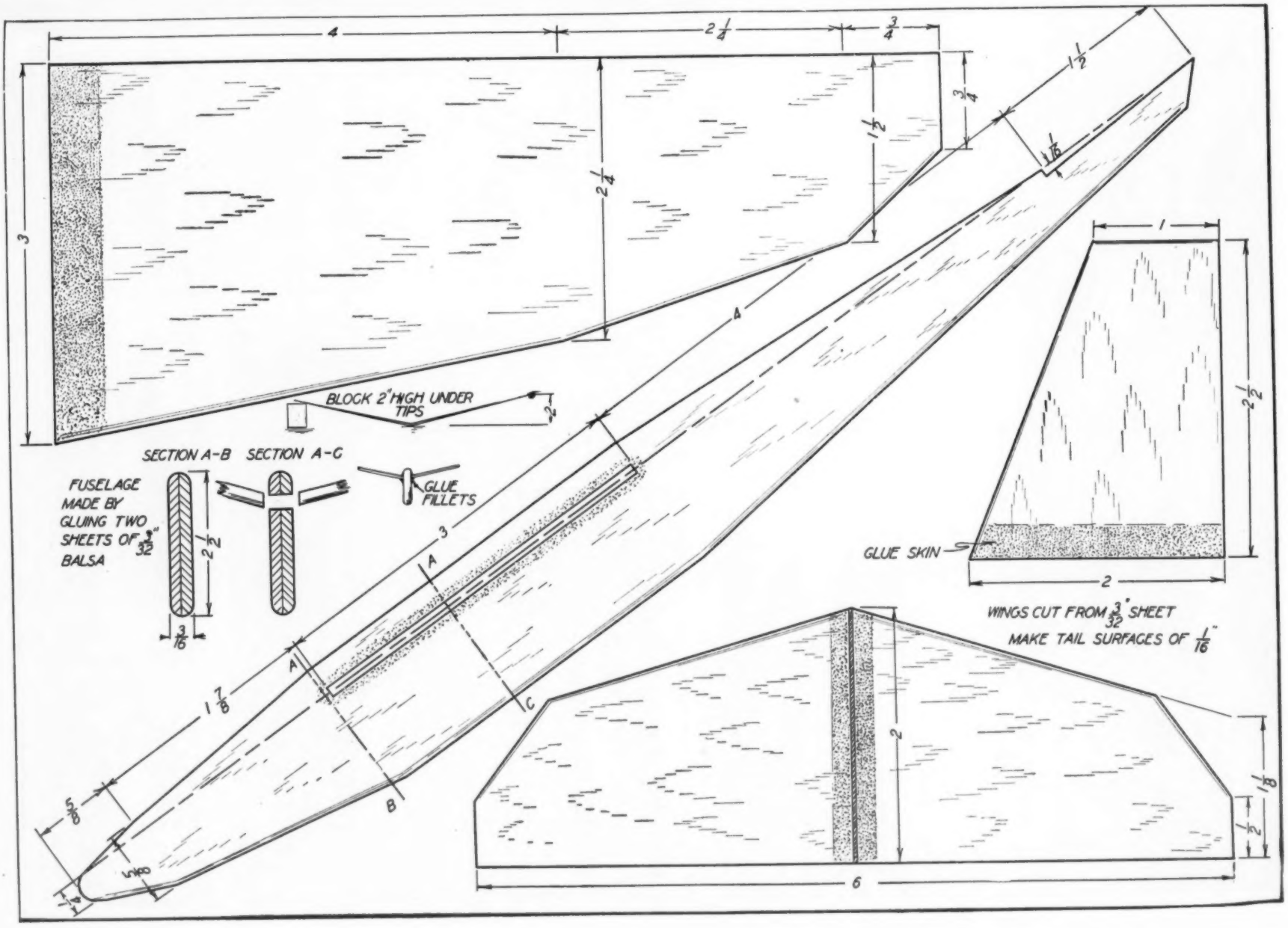
**EIGHT CENTS WORTH**

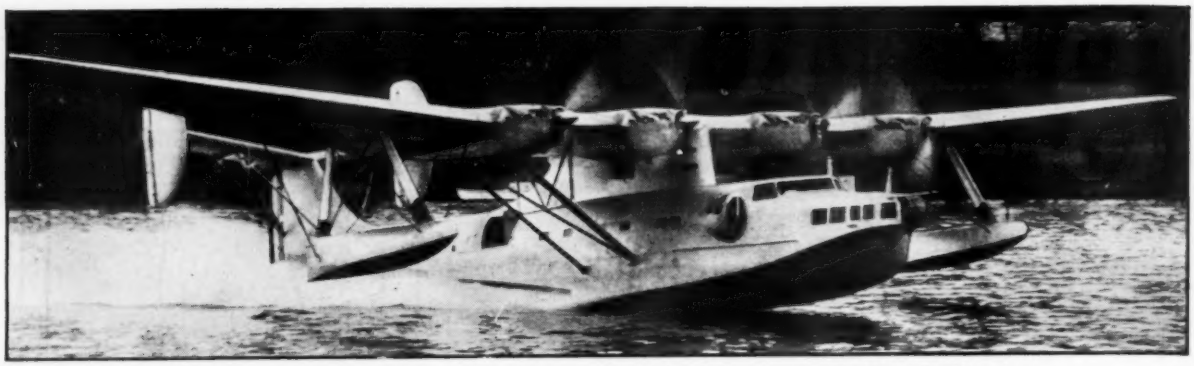
*Required Materials*

| | |
|---|---|
| 2 sheets balsa: 3/32" x 3" x 18" | 4c |
| 1 sheet balsa: 1/16" x 2" x 18" | 2c |
| Sufficient cement | 2c |
| Total cost, ready-to-fly | 8c |



**MODEL INSTRUCTORS AND CLUB LEADERS:—As a curtain riser on an eventual nation-wide drive to educate younger and less experienced enthusiasts in aeronautics through model building, by the presentation of simple, fool-proof miniature flying craft, MODEL AIRPLANE NEWS presents the "Tyro I," an outdoor all-balsa, hand-launched glider. This is the first of a series of refreshing new designs . . . interesting . . . easily built. You may give this plan to your most inexperienced builder with the knowledge that a creditable model can be produced.**


4
2 1/4
3/4
3
2 1/4
1 1/2
3/4
1 1/16
BLOCK 2" HIGH UNDER TIPS
2
4
SECTION A-B
SECTION A-C
GLUE FILLETS
FUSELAGE MADE BY GLUING TWO SHEETS OF 3/32" BALSA
2 1/2
3/16
3
A
A
1 7/8
5/8
1/16
B
C
1
2 1/2
GLUE SKIN
2
WINGS CUT FROM 3/32" SHEET
MAKE TAIL SURFACES OF 1/16"
2
1 1/8
1/2
6



The Potez, 22 ton war seaplane taking off on its trial flight. It has a speed of 165 m.p.h. (Acme)

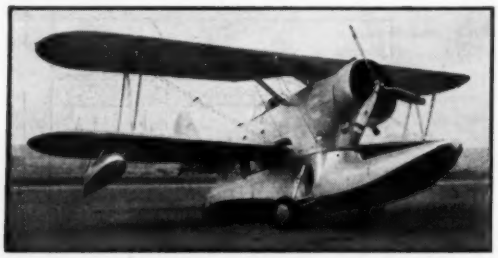
# On Frontiers

## Will the Creation of Immense Warfare? Latest Develop- Bakelite

### By ROBERT C. MORRISON

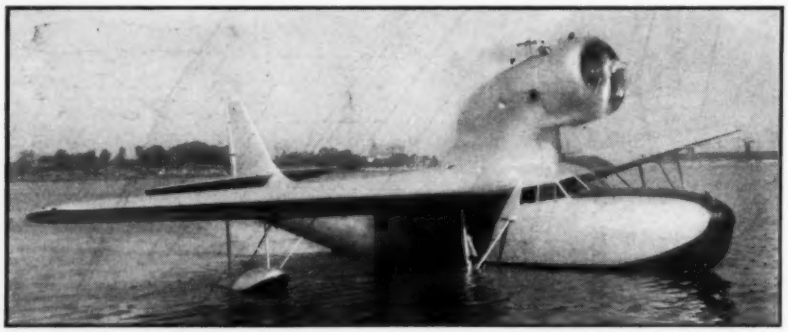
THERE was a loud roar followed by billows of smoke. The ocean was in a temporary turbulance as the old gray battleship waddled in its midst. Its "Big Berthas" had just profused a barrage of shells at the enemy. At each outburst the enemy's leader, Commander Zilch, would just snicker, for he had a fleet of flyingboats "up his sleeve" which after passing the cuff links would have the battle well in hand. On the battleship another carload of powder was sent forward and dumped into the guns. Everyone braced himself like an acrobat about to do his most spectacular stunt of the evening. There was another roar and another batch of shells whistled on their way with only a probability of finding their mark.

All this took time and meanwhile the enemy was not "just sitting around." On the contrary, Commander Zilch arose from his poker game and gave the signal to his boys.



Grumman J2F-1 utility amphibian. (G. S. Williams)

British supermarine "Walrus" amphibian. (G. S. Williams)



The Fairchild A942-13, 760 hp. Cyclone engine, for Japan's navy. (Tenety)

At once a goodly number of bombardment aircraft were approaching the battleship in rapid descent. Now the Navy often boasted of the accuracy of their anti-aircraft guns and this was the time to prove it. With a fleet of bombers coming after him, each one spitting 200 shells a minute from its nose, the chief gunner would have to do a Wild Bill Hickok to pick them ALL off in such a short space of time. If he was wise he would do a "Jesse Owens" instead, and make a dash for the hold of the ship in "nothing flat."

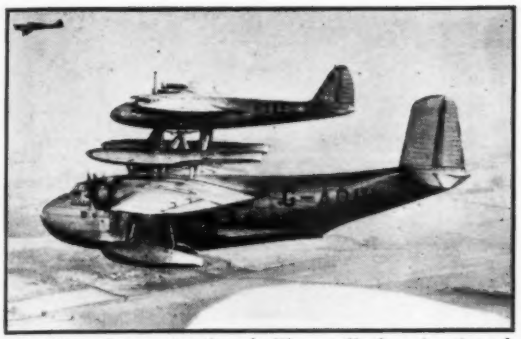
There is one airplane designer who says he can build a bomber that would circle the world with one stop on the way at 380 m.p.h. Just imagine the U.S.S. Idaho skimming along the top of the water making a world cruise in about five days. The only place you might see that is in the moving pictures with Stan Laurel and Oliver Hardy manning the ship.

But in Washington there are still strong advocates of the big "iron whales" —the battleships. They have been with us so long that we hate to part company. Glenn L. Martin tried to show before the House Naval Affairs Committee the superiority of the bombing plane. He claims that he can start work today on a 125 ton bomber carrying 4,000 pounds of bombs a distance of 11,000 miles at a speed of 380 m.p.h. With many of these to confront, the enemy might as well wrap itself in one big plaster cast. The cost of these planes would be far below that of a bat-

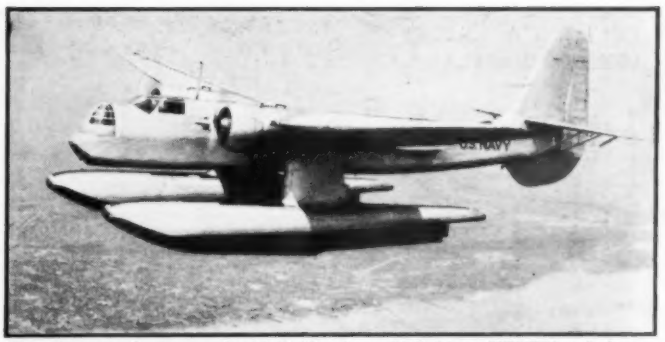
A real Fokker D-7 used in filming picture, "Men With Wings."

A Travel-Air revamped to represent a Fokker in "Men With Wings."

This Travel-Air is now a French pursuit plane in "Men With Wings."



The Mayo Composite aircraft. The small plane is released far out to sea to continue its flight. (Intern't)




The plane on the cover, the Hall-Aluminum U.S. Navy XPTBH-2. It has a speed of 240 m.p.h. Complete information on this ship given on page 29.

# Of Aviation

## Bombers Revolutionize Naval ments in Stainless Steel and Construction

**Plane on the cover—Page No. 29**

tleship. As a matter of fact a whole fleet could be built at the cost of one of those steel seagoing jobs. What will decidedly foster the design of these giant airplanes is the new 2,000 hp. Allison engine.

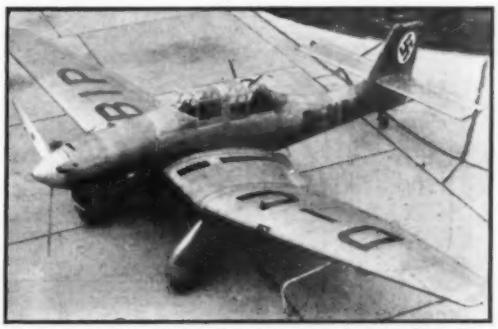
Word has leaked out that the Navy has ordered a total of 54 large four-engined flyingboats from Sikorsky and Consolidated! They are the XPBS-1 and XPB2Y-1. They will mount the latest in aircraft cannons which shoot 200 shells per minute. Even these airplanes put the battleship's life in question.

Unfilled orders as of February 15th at the Bell Aircraft Company plant registers $1,200,000, which goes to show that there will be many a Bell aircraft in our military air force shortly. Two Consolidated twin-engined flyingboats of the Navy type have been delivered to Russia. North American's revamped Dragon bomber is all set for another competition. The Army recently called for bids on attack bombers to be opened on March 17th, 1939.

While we are taking another glance at wood construction before dumping it overboard, the DeHavilland Company in England has plunged into all metal construction after upholding wooden airplanes for these many years. Just precisely what there new all metal craft will be like is not known as yet, but it is guessed that it will be used by the airlines so they will not have to buy our aircraft. It is said to be a twin-engined airplane carrying Bristol engines and about the same size as the Bristol Blenheim bombers.

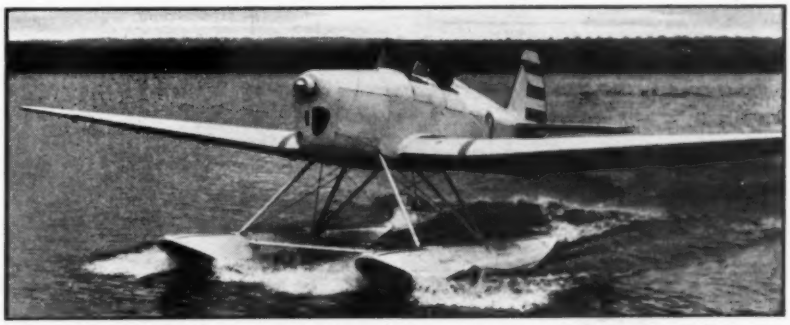
News on the Bakelite front also takes in England, where DeHavilland has been making propellers by the thermo-setting method. Then there is an Englishman named Mr. Hart-Still who hopes to build a light plane almost entirely of Bakelite and such an idea has very good points. However much more experimenting must be done, and that is what Mr. Hart-Still is doing. His first airplane will be built mostly of wood and those to follow will be built more and more of Bakelite as research goes on. The wing spars will probably be steel tubing with Bakelite flanges and paneling. The covering will be a shell of Bakelite.

*(Continued on page 38)*



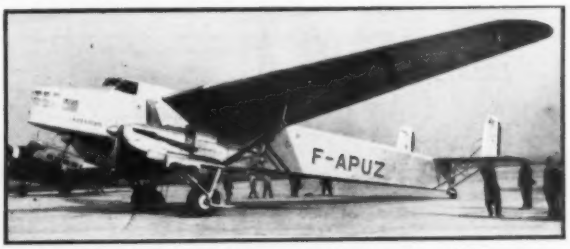
The new Junkers fighter-bomber, a typical modern German all-metal war plane. (Monkmeyer)

Lockheed 14-H with Fowler flaps. (G. S. Williams)

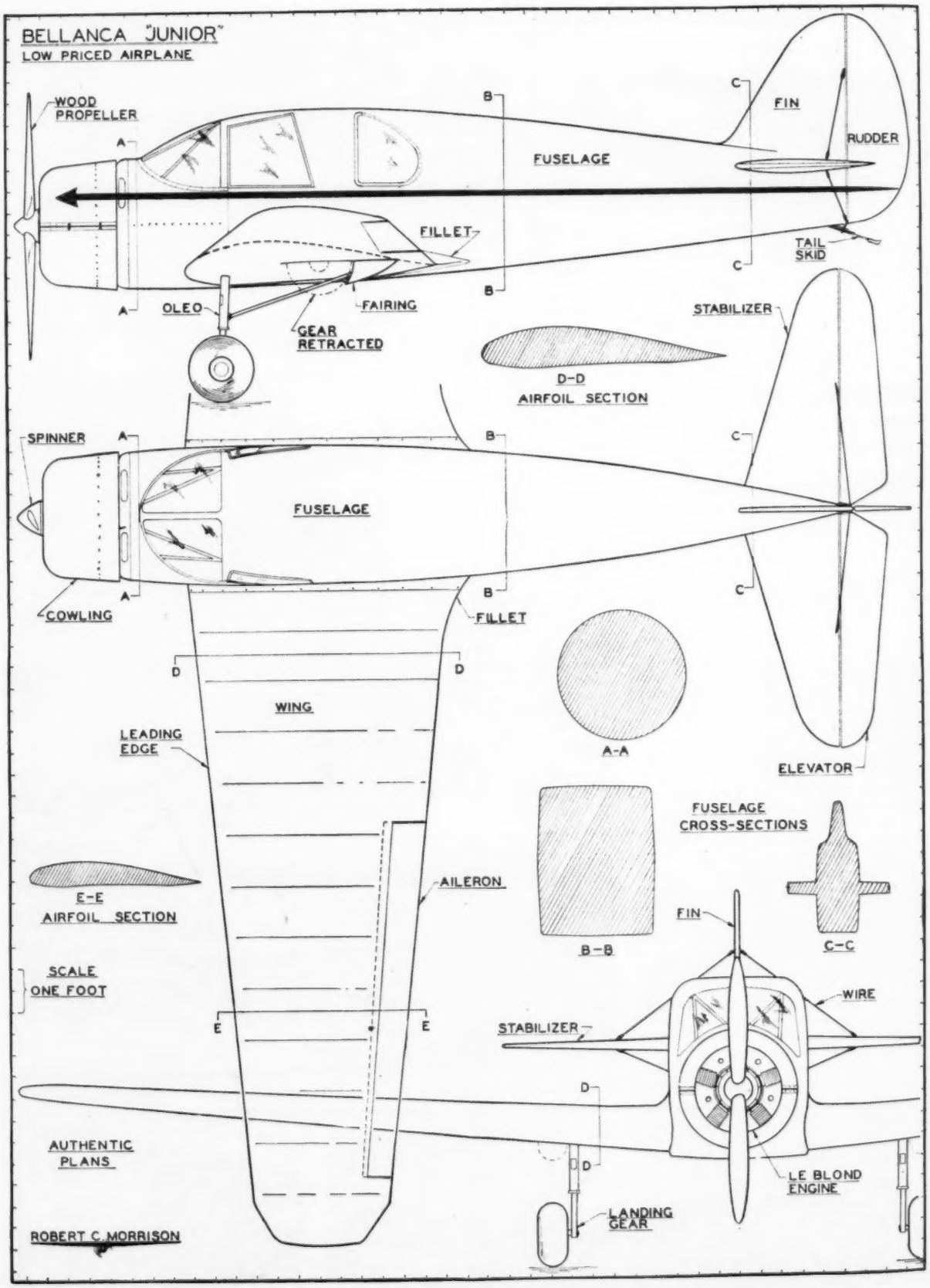


Russian UT-1 light sport seaplane that recently set a record of 219 m.p.h.

The latest British bomber, Vickers "Wellington." (Keystone)




This plane flew from LeBourget to S. America. (Keystone)


BELLANCA "JUNIOR"
LOW PRICED AIRPLANE
WOOD PROPELLER
FUSELAGE
FIN
RUDDER
TAIL SKID
FILLET
OLEO
FAIRING
GEAR RETRACTED
STABILIZER
D-D
AIRFOIL SECTION
SPINNER
FUSELAGE
COWLING
FILLET
WING
LEADING EDGE
A-A
ELEVATOR
FUSELAGE CROSS-SECTIONS
AILERON
E-E
AIRFOIL SECTION
B-B
C-C
FIN
SCALE ONE FOOT
WIRE
STABILIZER
LE BLOND ENGINE
LANDING GEAR
AUTHENTIC PLANS
ROBERT C. MORRISON

Photographs
by Frank Nekimken

# Have You Tried Microfilm?

## Here Is a Complete Explanation of How to Make This Superlight Wing Covering in Words and Pictures, by One Who Is an Expert

By CARL GOLDBERG

HAVE you tried to build indoor models, and been discouraged at your lack of success in covering the light framework with microfilm? Nearly everyone has. But those who succeeded (after many tries) have gone on to get lots of thrills out of the most scientific of model activities—indoor flying. It has that certain kick that no other has. So if YOU would like to take another crack at it, here's how to leap the big stumbling block—making and using microfilm.

Microfilm is the "fabric" used to cover the wing, tail and fuselage framework It's a sheet of very thin nitrocellulose, only about 5 to 10 one-millionths of an inch thick when made right. Being so thin, it's naturally very delicate, and cannot be sold ready made. Therefore, you have to make it yourself. How, you ask? Well, that's a bit of a story.

First, you must get the microfilm solution; the special liquid which, when poured on water, dries to form the thin sheet or "film." This solution could be made for you in a drug store, if you had the right formula. A GOOD formula for the solution is a valuable trade secret, and therefore is seldom published in magazines. However here is a formula that you may use with good results. Thin out banana oil with amyl acetate in the ratio of two parts oil to one part acetate. Add one-eighth part of castor oil to the mixture in order to give flexibility to the film. Keep the mixture tightly sealed in a bottle until you are ready to use it. It is best not to mix the solution and let it stand more than a day or two before using.

Obtain or make several ounces of the solution (because it takes quite a bit of practice to get the knack), and study the directions very carefully. Get the picture of how it's done. A very definite amount of solution must be poured on a definite amount of water surface, in order that the film dries to the right thickness. To control the amount of solution, the directions will tell you whether to use the cap of the can (or bottle) in which it comes, or to use a teaspoon. For the water surface, you may use your bathtub. But be sure the family is out, and that you air the bathroom thoroughly after you are through, because no one but a model builder likes the odor of evaporating microfilm solution!

*(Continued on page 44)*

The liquid film solution is poured carefully on the surface of water.

A wire hoop is placed under the film and the edges are gathered to the hoop.

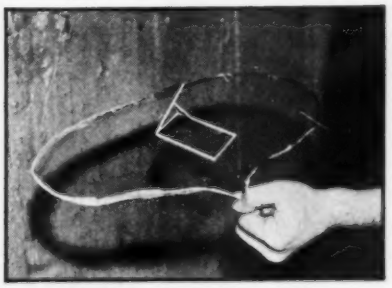
Lifting out the film on the hoop.

Painting the model frame with water.

Whetting the frame on to the film.

The model's frame is trimmed free of the surplus film with a hot wire.

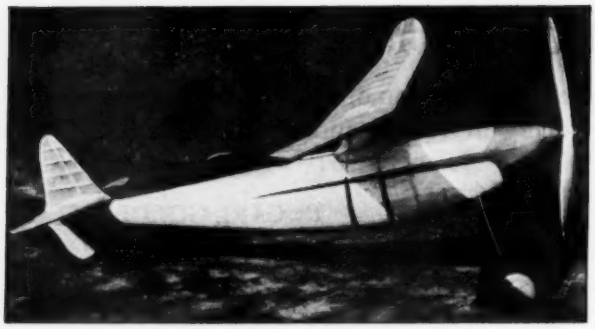
The wing spars then are cracked carefully to form the "dihedral."



Covering a frame for patching.

Applying the patch to the wing.

Removing frame after patching.



It actually is a soaring glider with power.

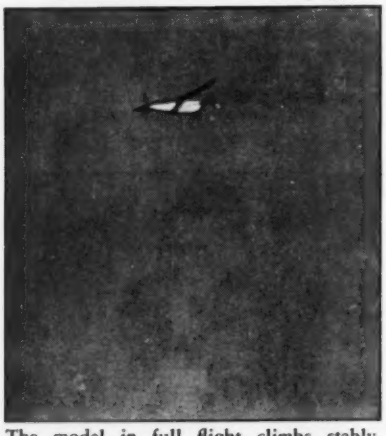
Torque effect is small due to careful design.

# Building the "Tsetse Fly"—Super Wakefield Model

## How This Stable, Efficient Plane Was Developed and How You Can Build It

By FELIX GUTMANN

A high lift, high aspect ratio and efficient wing give remarkable climb and soaring qualities.



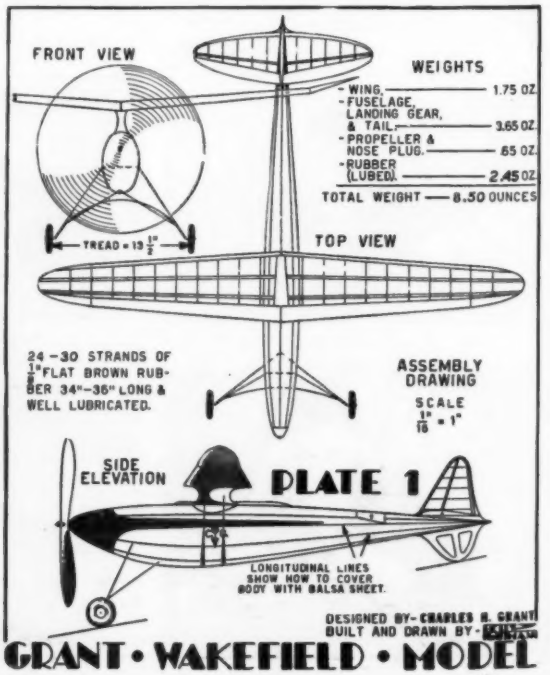
The model in full flight climbs stably, steadily and at a steep angle.

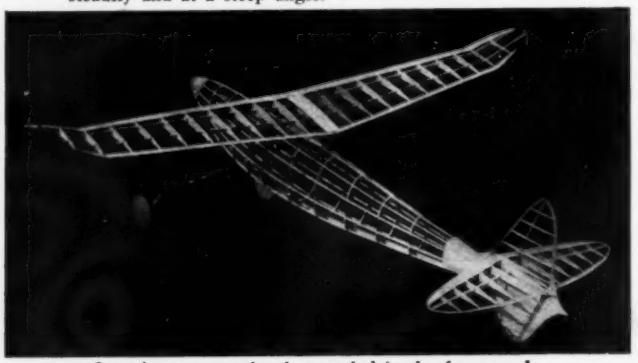
THOSE builders who have been waiting for THE supermodel, may terminate that waiting right here. This Grant designed Wakefield model is undoubtedly one of the finest flying models ever produced. It represents the ultimatum in refinement of stability and efficiency characteristics. Above all, its gliding qualities are unsurpassed. It is built to exact Wakefield specifications, having a wing of 200 square inches and a stabilizer slightly less than 33% of the wing area maximum. The weight is exactly 8 ounces, with 24 strands of ⅛" flat rubber. Tests have shown the model to have a gliding ratio of 15 to 1, remarkable for any model. This plane represents the results of scientific effort to produce a super model, and those efforts have been well rewarded.

The construction is not quite as simple as that of the average model, but the extreme pleasure involved in the production of a "flying tear-drop" more than makes up for the extra time required.

Due to the inappropriate weather during the winter months, when the model was built, it has never received a full wind-up.

The times when it was tested, the weather was very cold and windy. The model was hand-wound only, and given but 200 winds with 24 strands. Upon being launched it rose up steeply and gracefully without swerving, to over 100 feet. It "turned in" 40 seconds to one minute flights consistently during these trials. An unbounded pleasure is to watch this model glide in. If the propeller was absent one might think it was a tow-launched glider coming in. The land-



Superior construction is revealed in the framework.

ings are always perfect. The large wheels allow landings on grass lawns without nosing over. They also greatly aid the stability of the model in flight. Take-offs are nothing but hops into the ether. In the very near future the model will be given an opportunity to show what it can really do with a full wind-up of about 800 turns. The results of this test will probably be published in the "Air Ways" column of this magazine.

### Construction

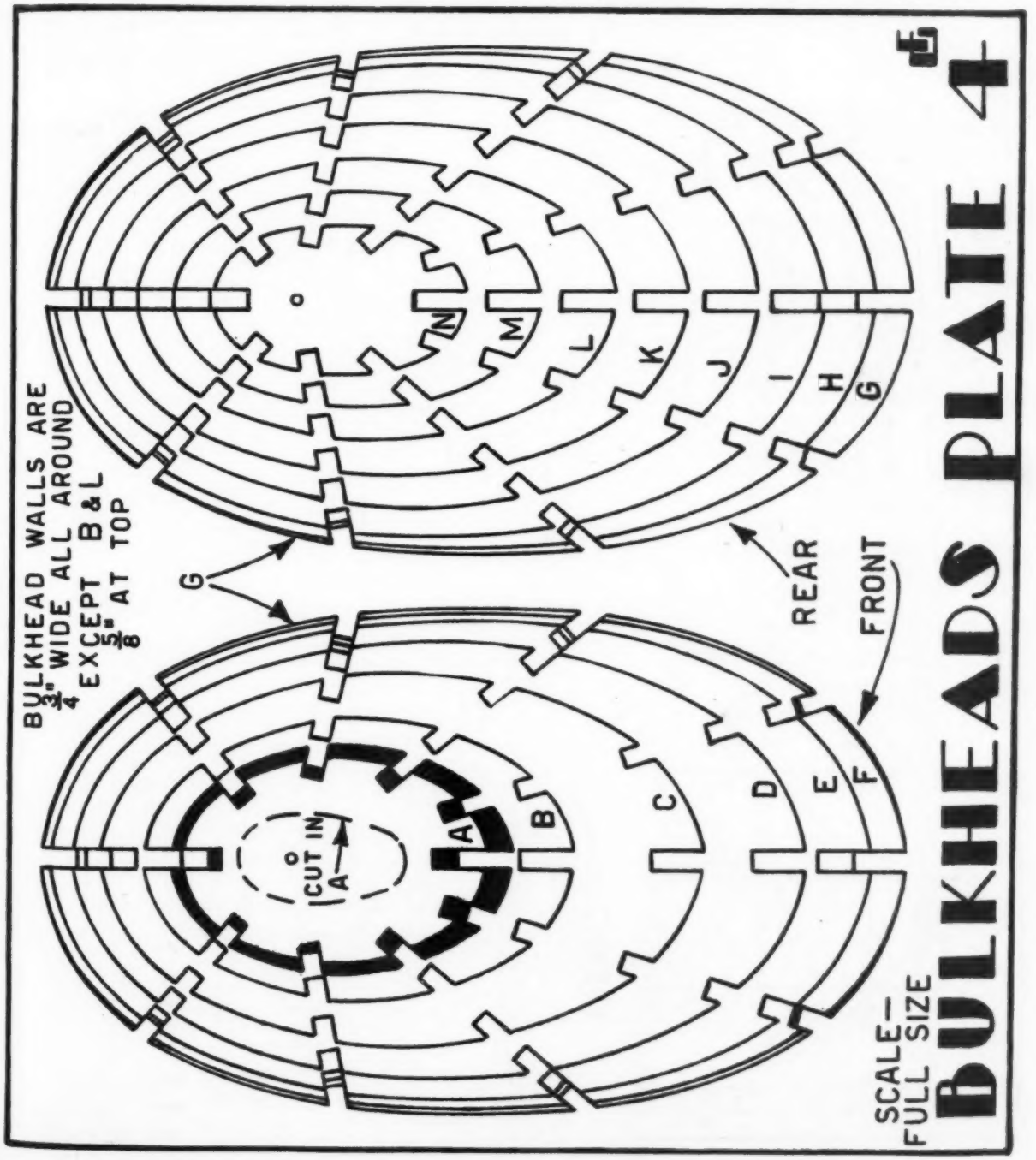
Now for the actual construction of the model: All the ribs and bulkheads have already been carefully plotted and drawn up full size in the accompanying plans, so the builder is spared a great many hours of toil right here.

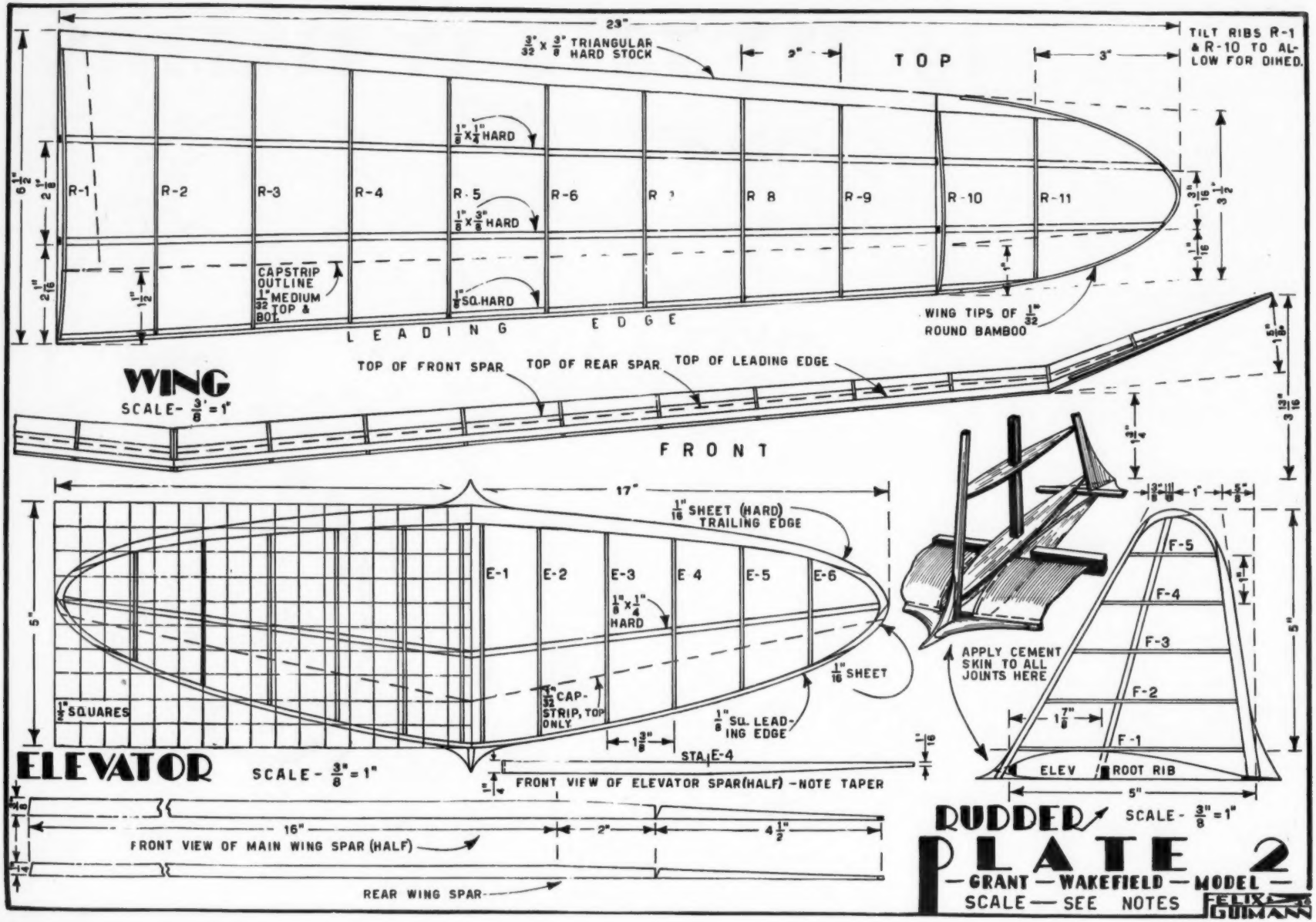
*Wing*

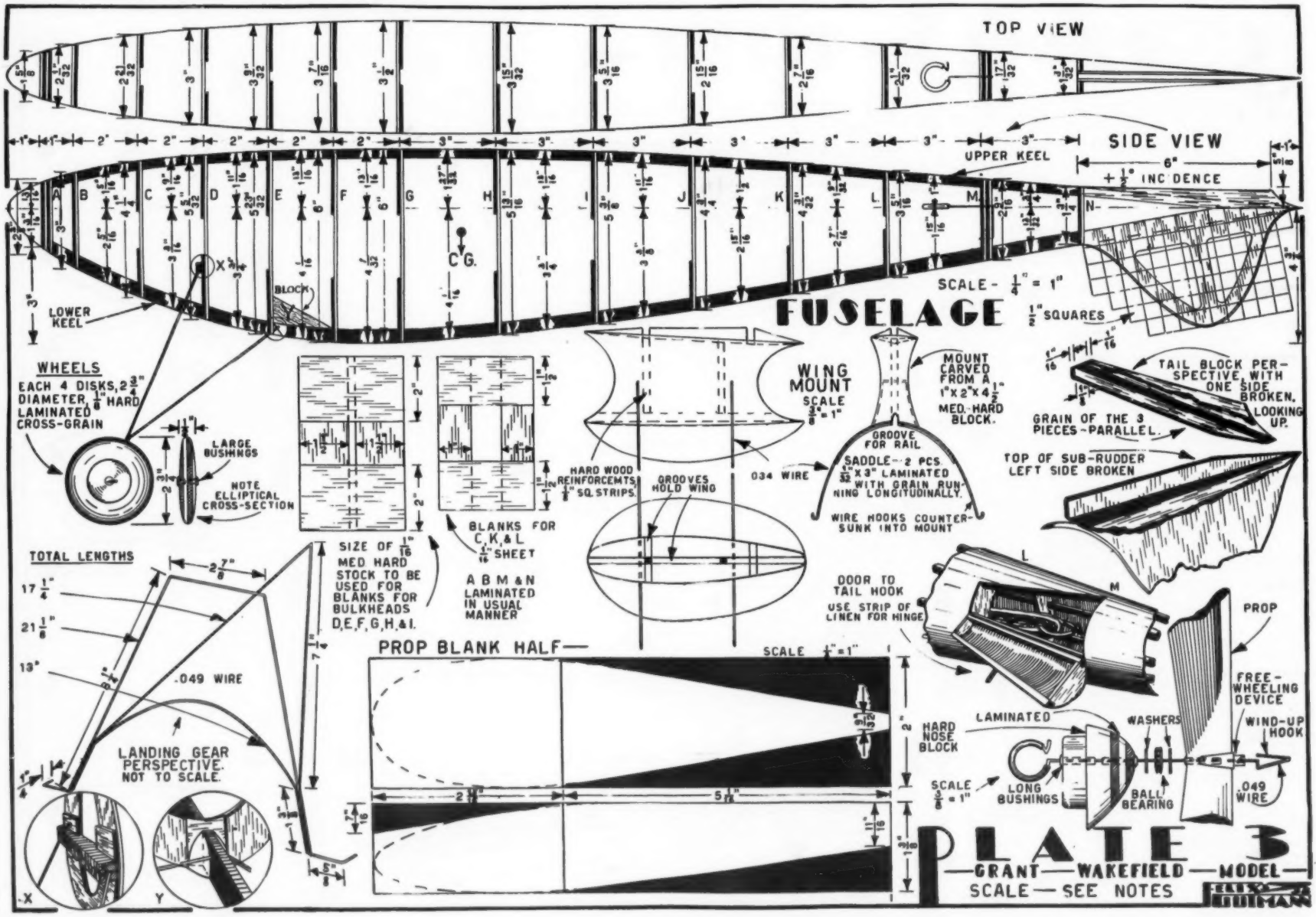
The rib outlines and stock sizes are on plate 5. The best way to transfer the rib outlines to the balsa is to use carbon paper. However do this only if the builder has drawing curves to carefully reproduce the airfoil. Another way is to use a hat pin with a beaded end. This is used as a pricker. Make a pin hole about every half inch over the straighter portions, and bring the holes closer together where the rib curves are more abrupt. This of course is done with the rib outlines over the balsa sheet. The beaded end will protect the finger. After all the ribs are transferred the holes on the wood are connected with a pencil line, thus completing the outline of each rib. Drawing curves also would insure a more accurate job here. Be careful not to accidentally superimpose or overlap two ribs on the balsa.

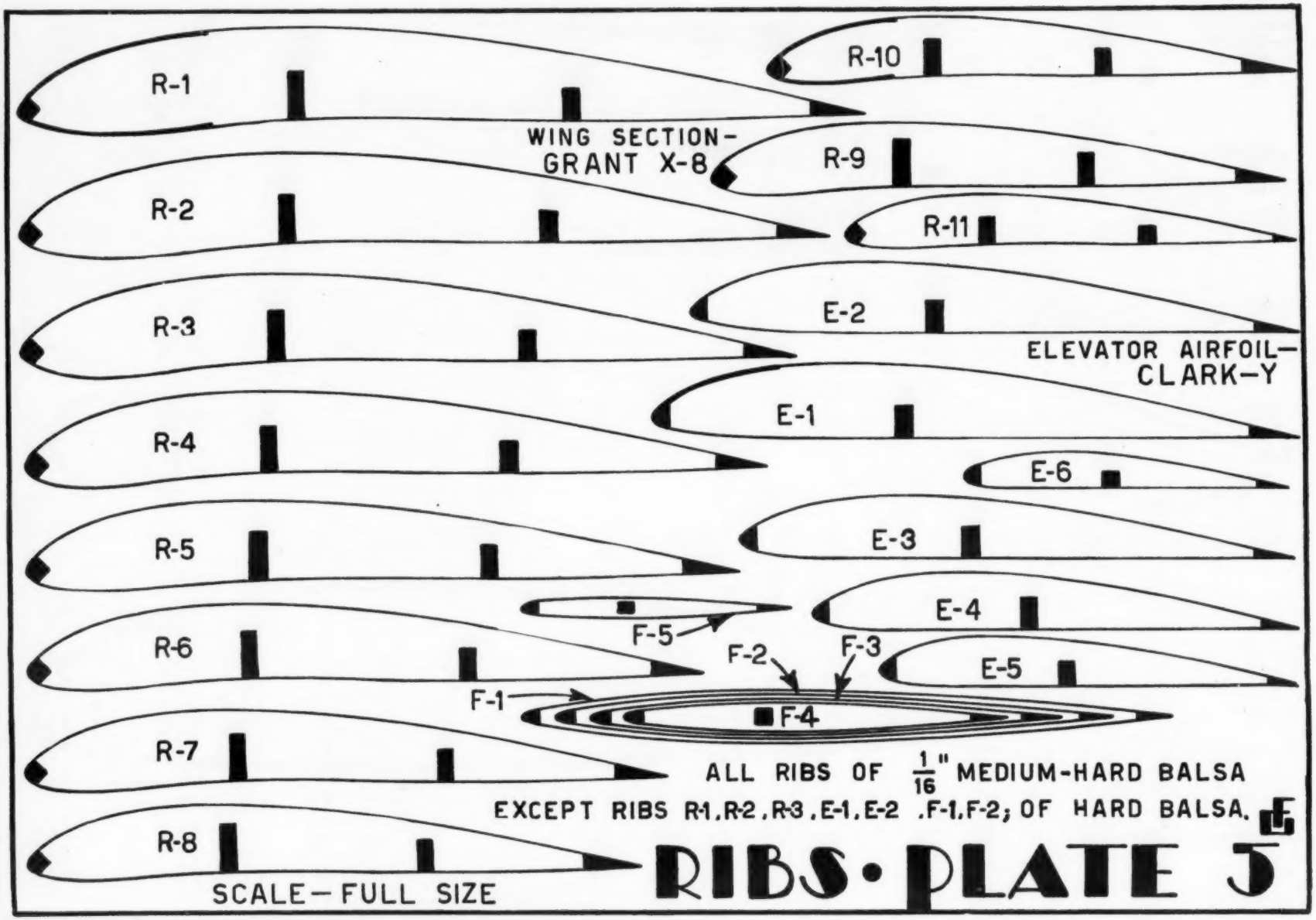
The ribs with notches for spars are then cut out with a sharp razor. The top view of the wing should be reproduced to full scale on a large piece of drawing paper or a board. It should be drawn twice, each one to represent a wing half. The wing

*(Continued on page 42)*




23"
3/32 x 3/8 TRIANGULAR HARD STOCK
TILT RIBS R-1 & R-10 TO ALLOW FOR DIHED.
TOP
R-1
R-2
R-3
R-4
R-5
R-6
R-7
R-8
R-9
R-10
R-11
1/8 x 1/4 HARD
1/8 x 3/8 HARD
1/8 SQ. HARD
CAPSTRIP OUTLINE 1/32 MEDIUM TOP & BOT.
WING TIPS OF 1/32 ROUND BAMBOO
LEADING EDGE
WING
SCALE- 3/8" = 1"
TOP OF FRONT SPAR
TOP OF REAR SPAR
TOP OF LEADING EDGE
FRONT
17"
1/16 SHEET (HARD) TRAILING EDGE
E-1
E-2
E-3
E 4
E-5
E-6
1/8 x 1/4 HARD
1/16 SHEET
1/32 CAP-STRIP, TOP ONLY
1/8 SQ. LEADING EDGE
1/2 SQUARES
STA E-4
ELEVATOR
SCALE - 3/8" = 1"
FRONT VIEW OF ELEVATOR SPAR (HALF) - NOTE TAPER
16"
2"
4 1/2"
FRONT VIEW OF MAIN WING SPAR (HALF)
REAR WING SPAR
F-5
F-4
F-3
F-2
F-1
ELEV
ROOT RIB
APPLY CEMENT SKIN TO ALL JOINTS HERE
5"
RUDDER
SCALE - 3/8" = 1"
PLATE 2
— GRANT — WAKEFIELD — MODEL —
SCALE — SEE NOTES
FELIX GUIMAN


TOP VIEW
SIDE VIEW
UPPER KEEL
LOWER KEEL
BLOCK
C.G.
SCALE - 1/4" = 1"
FUSELAGE
1/2" SQUARES
WHEELS
EACH 4 DISKS, 2 3/4" DIAMETER, 1/8" HARD LAMINATED CROSS-GRAIN
LARGE BUSHINGS
NOTE ELLIPTICAL CROSS-SECTION
BLANKS FOR C, K, & L 1/16" SHEET
A B M & N LAMINATED IN USUAL MANNER
SIZE OF 1/16" MED HARD STOCK TO BE USED FOR BULKHEADS D, E, F, G, H, & I.
WING MOUNT
SCALE 3/8" = 1"
MOUNT CARVED FROM A 1" X 2" X 4 1/2" MED-HARD BLOCK.
GROOVE FOR RAIL
SADDLE - 2 PCS 1/32" X 3" LAMINATED WITH GRAIN RUNNING LONGITUDINALLY.
WIRE HOOKS COUNTERSUNK INTO MOUNT
.034 WIRE
HARD WOOD REINFORCEMTS 1/4" SQ. STRIPS.
GROOVES HOLD WING
TAIL BLOCK PERSPECTIVE, WITH ONE SIDE BROKEN, LOOKING UP.
GRAIN OF THE 3 PIECES - PARALLEL.
TOP OF SUB-RUDDER LEFT SIDE BROKEN
DOOR TO TAIL HOOK
USE STRIP OF LINEN FOR HINGE
PROP
TOTAL LENGTHS
17 1/4"
21 1/8"
13"
.049 WIRE
LANDING GEAR PERSPECTIVE. NOT TO SCALE.
PROP BLANK HALF
SCALE 1/4" = 1"
HARD NOSE BLOCK
LAMINATED
WASHERS
FREE-WHEELING DEVICE
WIND-UP HOOK
LONG BUSHINGS
BALL BEARING
.049 WIRE
SCALE 3/8" = 1"
PLATE 3
GRANT — WAKEFIELD — MODEL
SCALE — SEE NOTES
FLEX-O-FILM


R-1
R-10
WING SECTION-
GRANT X-8
R-9
R-2
R-11
R-3
E-2
ELEVATOR AIRFOIL-
CLARK-Y
E-1
R-4
E-6
R-5
E-3
E-4
F-5
R-6
F-2
F-3
E-5
F-1
F-4
R-7
ALL RIBS OF 1/16" MEDIUM-HARD BALSA
EXCEPT RIBS R-1, R-2, R-3, E-1, E-2, F-1, F-2; OF HARD BALSA.
R-8
SCALE—FULL SIZE
RIBS • PLATE 5

# *Free* 2 ROUND TRIPS by AMERICAN AIRLINES to HOLLYWOOD and M-G-M STUDIO

by writing a 200 to 300 word essay on the question:

**WHAT DO YOU THINK OF THE AIRPLANE AS A MEANS OF NATIONAL DEFENSE?**

**1st Prize: ROUND TRIP TO HOLLYWOOD**
**2nd Prize: ROUND TRIP TO HOLLYWOOD**
**3rd Prize: CUSTOM-BUILT PILOT RADIO**

***Plus*** —THE CHANCE TO MEET CLARK GABLE, STAR OF "TEST PILOT"
—A PERSONAL GIFT FROM CLARK GABLE—CONSISTING OF A FLYING SUIT SIMILAR TO ONE IN THE PICTURE.

## ALL AIR-MINDED AMERICANS CAN ENTER THIS

## *National Essay Contest*—SPONSORED JOINTLY

## BY MODEL AIRPLANE NEWS and Metro-Goldwyn-Mayer

IN CONJUNCTION WITH THE FEATURE PICTURE

# TEST PILOT

STARRING

# CLARK GABLE

# MYRNA LOY

# SPENCER TRACY

WITH LIONEL BARRYMORE

### THE RULES ARE SIMPLE

1. Anyone can enter except Model Airplane News and Metro-Goldwyn-Mayer employees.

2. There is no entry fee. Send, or take, your essay to "Test Pilot" Contest, Model Airplane News, 551 Fifth Avenue, N.Y.C., or M.G.M., 1540 Broadway, N.Y.C.

3. The contest is open now and closes September 1st, 1938.

4. Essays will be judged for originality and neatness. The decisions of the judges will be final.

## ALL EXPENSES PAID!

**1st and 2nd Prizes will be 2 Free Round Trips via the American Airlines Flagship and will include free hotel accommodations, meals and transportation necessary to reach airports, Hollywood and the M-G-M Studios and return.**

### A $250 CUSTOM-BUILT PILOT RADIO IS THE 3rd PRIZE!

**A magnificent radio machine has been contributed by the internationally-known Pilot Radio Corporation. It will constitute a Third Prize to be awarded in this National "Test Pilot" Essay Contest.**

## Judges for the National "Test Pilot" Essay Contest Are

**Clark Gable, Victor Fleming, Spencer Tracy, Louis D. Lighton, Wm. R. Enyart—N. A. A Contest Board, Major General Oscar Westover—Chief of Air Corps, Col. Alexander P. deSeversky and Major James H. Doolittle.**

# National Aeronautic Association Junior Membership News

*Prepared by National Aeronautic Association, Dupont Circle, Washington, D. C.*

TWENTY-ONE model builders will win championship crowns and hundreds of lucky model builders will come home victoriously laden with trophies and medals after the battle of skill at the 1938 National Championship Model Airplane Meet in Detroit, July 6th to 9th.

Prizes ranging from huge trophies, that will need the assistance of your friends to bring home, to handsome plaques and medals, will be awarded to winners and runners-up in each of the seven national and two international events and sub-divsions at this year's meet.

**The "spirit" of Detroit sheds its light far and wide, beckoning model fliers to join the parade to the Nationals in July.**

### National Champion To Be Declared

The contestant who places in most events indoor, outdoor and gas, will be given the title of National Model Airplane Champion, and will receive that handsome 50 inch American Model Championship Trophy which will be presented by the Detroit Exchange Club, plus a cash award of $200. A point system is being devised which will apportion points among the various events and the contestant scoring the greatest number of points will be named the Champion. If you did need further incentive to participate in all events, you will be happy to learn of this new award.

### Meet Your Friends At The Nationals

You will meet model builders from every state in the Union and exchange experiences. Make new friendships, renew old ones, and compete in the battle of skill and sport which will climax your year of designing and building.

Entertainment and fun galore await you in Detroit! The Detroit Exchange Club, sponsors of this year's contest, are making elaborate preparations to make your stay a memorable one. Howell Eurich, and every one of the members on the Exchange Club Aviation Committee, together with many air-minded Detroit citizens, are doing everything in their power to make this the most outstanding contest ever held. A dizzy whirl of entertainment, contests, trips to points of interest and centers of industry, banquets and meetings will make this event one you will never forget.

All these events will draw you irresistibly towards the Nationals, the glorious culmination of a year's hard work, and the most looked-forward-to model meet of the year.

### Send For Your Application

If you are planning to come to Detroit send your request today to the National Aeronautic Association, Contest Committee, Dupont Circle, Washington, D.C. and enclose a 5c stamp or a self-addressed envelope, and you will receive detailed rules and an application. Be sure that you have renewed your N.A.A. membership or that your N.A.A. membership is in effect at the time of the contest. Don't wait until you get to Detroit to renew your membership. Do it before you start out!!

### Flying Scale Rules

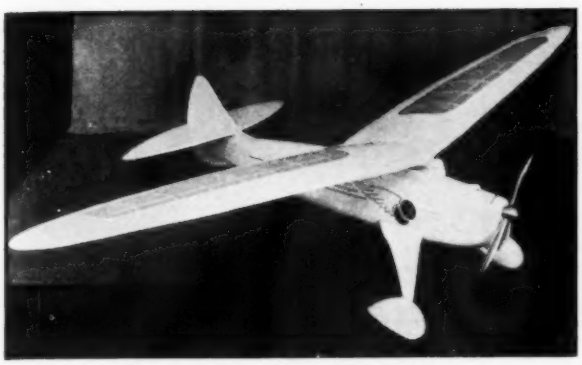
In order to further encourage the building of flying scale models more stress will be placed upon this event this year. The rules are as follows:

The propellers must conform in diameter to the original but may be altered in blade, width and pitch. Wing area of models in this event must not exceed 200 square inches. Models must conform to the outdoor weight rule of 3 ounces for every 100 square inches of main wing area. All models will be judged according to the following point system:

**Mr. Robert Sommers of St. Louis, Chairman of the 1st. N.A.A. Model Conference.**

**Mr. Edward Roberts, Sec.-Treas. of the Academy of Model Aeronautics.**

**Mr. Walt Grubbs, our new Junior N.A.A. Secretary. (He has a tough job).**



A custom built plane by Wm. Effinger.

Mr. J. K. Coppage and his modified Buccaneer.

## Point System

| *General Workmanship* | *Full Value* | *Judges Estimate* |
|---|---|---|
| 1. Neatness of workmanship | 8 | |
| 2. Amount of detail (Some builders go into more detail than others, reproducing engine cylinders, instrument boards, controls, lights, etc.) | 8 | |
| 3. Originality in reproduction of parts | 6 | |
| 4. Color and finish similarity | 3 | |
| Total | 25 | |
| *Fidelity to Scale* | | |
| 1. Fuselage (length, depth, width) | 5 | |
| 2. Wings (chord, span, airfoil) | 5 | |
| 3. Landing gear | 5 | |
| 4. Empennage (dimension of control surfaces) | 5 | |
| 5. Engine-propeller, etc. | 5 | |
| Total | 25 | |

In additon to the 50 points for general workmanship and scale, a model will be required to make a qualifying 30 second flight. Twenty-five points will be offered for this qualifying flight. Additional points up to a maximum of twenty-five points will be offered in proportionate amount between the minimum flight of 30 seconds and the maximum flight made during the meet. This makes a total of 100 points in all. A contestant may present only one model to be judged for workmanship. If this model cracks up before an official flight is made a second or third model may be presented to be judged for workmanship.

Exact scale outline plans from which the model was built must be submitted to the Contest Director, Hotel Fort Shelby, Detroit, Mich., not later than July 5th. The scale to which the model was built must be indicated on the plans.

A delegate from the "South"; we don't know his name. (Apologies).

## You Can Help

All contest directors and model leaders who own accurate stop-watches are asked to cooperate with the contest committee in lending them for the use of official timers at the meet. If possible you are urged to ship your stop-watches, well packed and insured, to the office of the Contest Director in Detroit, so that they may be checked and synchronized in time for the meet.

## Register Early

Plan to arrive in Detroit some time July 5th, so that you can register, establish yourself and get your models in shape. Special rates have been arranged for contestants and persons accompanying contestants at the headquarters hotel—the Fort Shelby.

Mr. Frank Dallaire came all the way from Detroit, Michigan.

Mr. Albert Lewis of Boston, Pres. of the Academy of Model Aeronautics.

For both beginner and expert the National Meet holds promise and thrills galore—here the amateur and the champ compete on equal terms, and many is the time a 13 year old youngster "from the sticks" walked off with important awards, competing with old, experienced model builders.

### On to Detroit July 6th to 9th

The first National N.A.A. Airplane Conference was held in Washington on March

*(Continued on page 53)*

***Fill in the coupon below for membership in the N.A.A.***

**Use this coupon for either model membership application or for requesting NAA Gas Division application.**

NATIONAL AERONAUTIC ASSOCIATION OF U. S. A.
Dupont Circle, Washington, D. C.

☐ I enclose fifty cents for annual NAA Model membership dues (use cash, check or money order) and hereby make application for Model membership in the National Aeronautic Association (age limit 21 years). There (is—is not) an NAA Model Chapter near me.

☐ Please send me the license application and pledge of the Gas Model Division of the Junior NAA (no age limit), which I must sign to become a member of the Gas Division. There (is—is not) a Gas Chapter near me.

☐ Please send me information on how to form an NAA Model Chapter and a Chapter charter application form. I enclose 10c in stamps.

Name .....
(Please print or type)

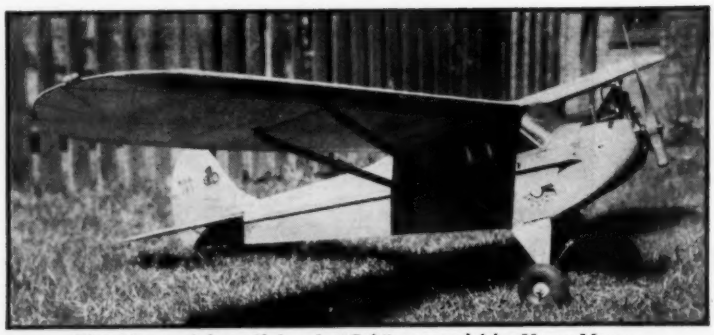
Street .....

City ..... State .....

Date of Birth .....
(Month, Day, Year)

Membership application approved* .....

*(If membership application is being made and applicant is under eighteen, have parent sign here.)



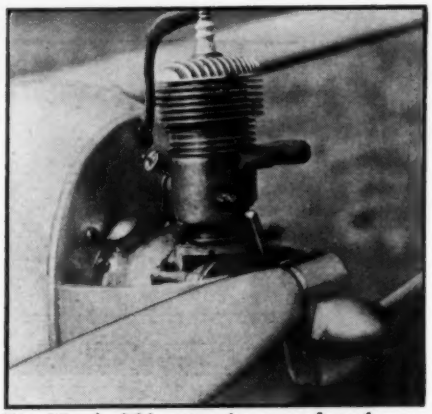
Pict. No. 1. A beautiful scale "Cub" gas model by Harry Moyer.

# "Gas Lines"

## Official Section of the National Aeronautic Association Gas Model Division

*Formerly the I.G.M.A.A.*

**Send In Your Opinions and Ideas to "Gas Lines" So That Satisfactory Gas Model Rules May Be Established**



Pict. No. 4. This motor is mounted on the gas tank. Note the clever changeable pitch propeller.

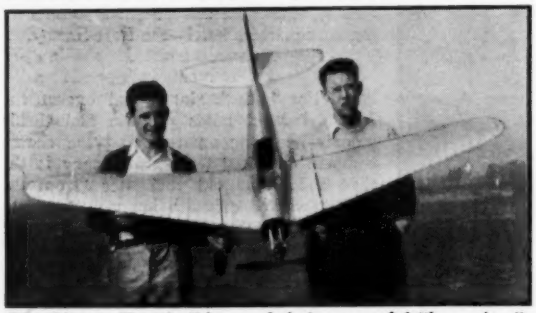
ALL gas model fans will be interested to learn of the official rulings which will govern gas model activities for the coming year. These rulings were decided upon by delegates of gas model builders at the National Conference held in Washington on March 12th. A pledge-application was sent out by the gas model division of the National Aeronautic Association, embodying regulations which all members pledged themselves to follow. These regulations were established in order to eliminate any possible dangers due to gas model flying. It is felt that several requirements of the pledge restricted model fliers to too great an extent. They were taken up at the conference.

One of them was that no provision was made for those under sixteen years of age who wished to fly gas models under N.A.A. ruling and sanction. At the conference it was decided that this younger group should not be prohibited from becoming familiar with this sport. Under the present ruling any one under 16 may fly a gas model under the direct supervision of a member of the N.A.A. over 16, who has been appointed to assume this responsibility by an N.A.A. contest director. In such a case the supervising N.A.A. member is directly responsible for the results of the activities of the gas model flier under 16.

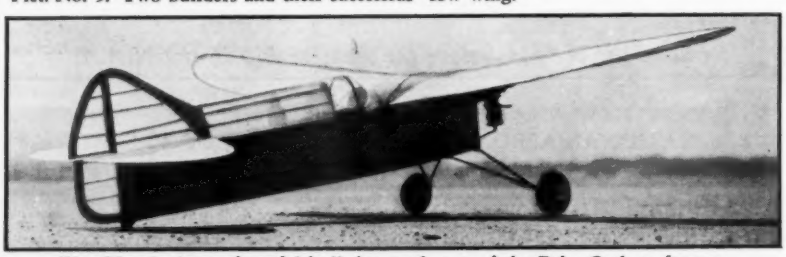
A rule was made which provides that a model shall not weigh less than ten ounces per square foot of wing area. Also provision was made for those who wish to build models which may be heavier than seven pounds total weight and which may weigh less than ten ounces per square foot, for means of experiment and research. Such persons may obtain a special license from the N.A.A. for these purposes, provided they are responsible persons.

It is not the object of the N.A.A. or the gas model builders who are governing its policy through the National Academy of Model Aeronautics to curtail unreasonably the activities of model fans. Therefore MODEL AIRPLANE NEWS requests that all readers interested in the subject write to the editor, Mr. Charles H. Grant, 551 Fifth Avenue, New York City, and express their views concerning rulings that should govern gas model flying.

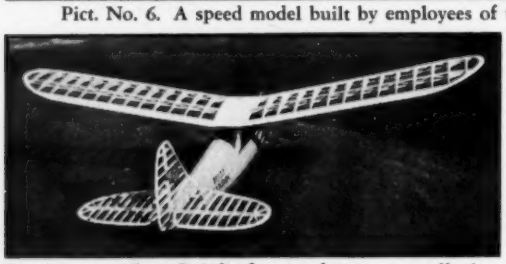
MODEL AIRPLANE NEWS wishes to state definitely that it is *not in favor* of a minimum wing loading of ten ounces. If there is to be any rule in respect to wing loading, a minimum load of eight ounces is favored. The ten ounce rule encourages the building of models with small wing areas; for in order to increase the wing loading, the wings are cut to the required amount for the weight of the model. Then, in order that the performance shall not suffer from this procedure, it is required to increase the power relative to the weight in order to compensate for the lack of wing area. In other words, certain gas model fans, desiring to restrict the flying capacity of the model, have demanded an increase in the wing loading without realizing that a high performance



Pict. No. 5. Two builders and their successful "low wing."

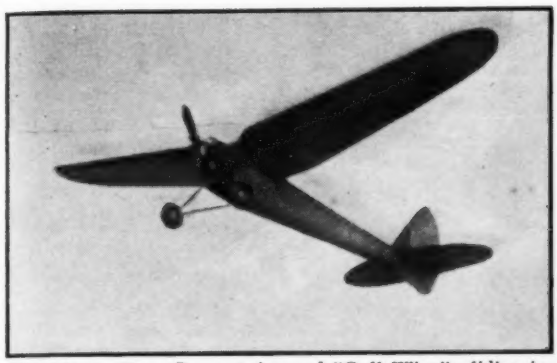


Pict. No. 6. A speed model built by employees of the Baby Cyclone factory.



Pict. No. 7. Albert Baird's first gas buggy; a swell piece of work for a beginner.


Pict. No. 8. A 26-inch racing boat with a miniature gas motor. It hit 38.2 miles per hour on its trials. Built by Bill Atwood.



Pict. No. 2. Peter Bowers' 4 pound "Gull Wing" gliding in.

Pict. No. 3. Two extremes in gas models, and their parent, J. Coppage.

can be obtained just the same with the high wing loading, merely by decreasing the power ratio. That is, by putting more power in the ship, it will climb at a faster rate.

Thus the objective of restricting the flight of the plane by putting on the wing loading restriction has not been accomplished. What has been done is that those who have made the ruling have forced gas model fans to reduce the size of their ship; making it heavier and faster, and consequently more dangerous to anything it may hit. They have not restricted the radius of flight as they had intended.

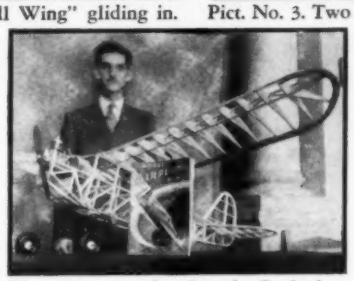
It is the opinion of the editor that restricting the wing loading is an improper method of restraining gas model performance. The only way to do this is to limit *wing loading and power loading.* There is no use "plugging one hole if the rabbit can run out another." The following formula is recommended to restrict the flight of planes beyond certain limits. This takes into account the weight, the area and the power of the engine. It is:

$$\frac{A\ Cu}{W^2} = 3.5 \text{ or more.}$$

In this, (W) is the weight of the plane in pounds, (A) is the area in square feet and (Cu) is the cubic inch displacement of the airplane; that is, the stroke times the area of the top of the piston. In conjunction with this formula the wing loading should not be less than eight ounces per square foot. This rule would limit the size of flight capacity of large area models which have great soaring ability, and also it would limit the flight capacity of small models, which the present rule does not do. By "small models" we mean small models relative to the amount of power used.

We invite readers to send in their comments on this subject. Also those who wish to have the suggested ruling established should write to Mr. Al Lewis, Junior Aviation League, Jordan Marsh Company, Boston, Massachusetts, and make their recommendations. Mr. Lewis is the president of the Academy of Model Aeronautics, which is the governing body in the N.A.A. of model aviation.

A number of young men have sent in applications to the N.A.A. and have not received their license numbers. We beg them to be patient in this respect as the N.A.A. offices have been pretty well "chocked up" with new business and with the procedure of establishing the new program of model aeronautics. They will receive their license numbers in due time.



Pict. No. 10. Sr. Joseph Cagigal y Calas, of Havana, Cuba, and his gas job.

Pict. No. 9. Don't let the looks of this plane by Leo Shulman fool you; it's a swell flier.

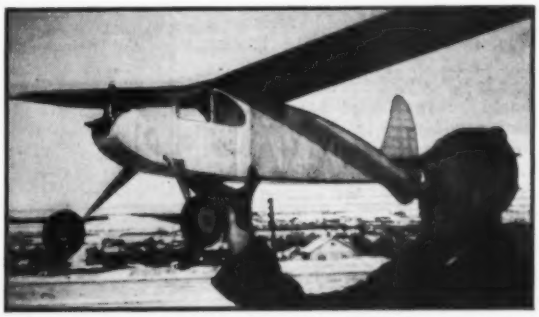
Those who wish to check the performance of their gas models can do so by means of the chart appearing in the May issue on the bottom of page 13.

We now have a few items of interest which have been sent to us by gas model builders from various parts of the country. Picture No. 1, at the head of the column, comes from one of our old builders, Harry E. Moyer of 612 Walnut Street, Lebanon, Pa. It shows his Taylor Cub, equipped with a one bladed propeller. This ship also boasts of lights for night flying. You will note that Mr. Moyer has his N.A.A. license number. He says that this model has had fifty flights and that the one bladed prop sure takes it "up there." The span is 84 inches and weighs 4½ pounds. One interesting feature about the one bladed propeller is that the "stub" always stops in the down position when the engine cuts. Thus a great deal of the possibility of breaking a prop is eliminated.

Picture No. 2 shows Peter Bowers' gull wing coming in on the glide. Bowers lives at Los Altos, Calif., Box 357. The plane has a seven foot wing spread and monocoque fuselage. The motor is inverted. The body was built up of 3/32" sheet balsa, then sanded and covered with silk. The tail surfaces are an integral part of the fuselage. Bowers used the Gottingen 490 airfoil for the wing. The model was originally designed for the eight ounce weight rule, so Bowers, using considerable ingenuity, built into the fuselage a World War hand grenade so that the ship would weigh ten ounces per square foot. He says that the

*(Continued on page 60)*

Pict. No. 11. James Condon, his "Miss America" and a Stinson. Don't let this trick picture fool you.



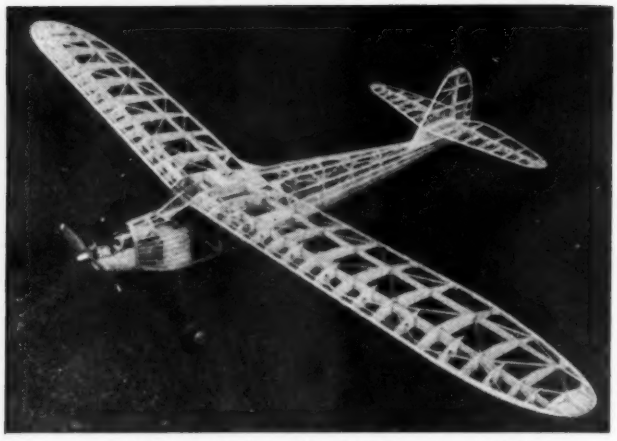
Pict. No. 12. Ed Sendwoda and his graceful gas model.

# How to Build A Gas Powered Camera Model

## How to Complete a Consistent Contest Flier Which Will Also Carry Aloft a Camera to Snap Aerial Photos

PART No. 2

By ELBERT J. WEATHERS



The uncovered frame displays the refined structural design prevalent in this plane. Though light in weight, it is strong.

THE first part of this article, "How to Build a Gas Powered Camera Model," was published in the May issue. Readers who may wish to build the model should read over the first part carefully before considering the instructions which follow. This plane is a very unusual ship in many respects.

First of all, it is constructed to carry a small camera which, by means of a timer, takes a picture from the plane when it is in flight. On the whole the plane is a very fine performer. It climbs steeply but steadily when fully loaded, camera and all; and it has a glide that compares with the "best of them." It is not of makeshift construction but rather is a carefully engineered job that is worthy of the finest craftsman.

This model will serve well as a contest ship, and as such, has a fine rate of climb and excellent soaring qualities. It has about seven feet of area and with the camera weighs five pounds. Without the camera it weighs slightly over 4½ pounds. This ratio of weight to area produces a wing loading of slightly over ten ounces per square foot.

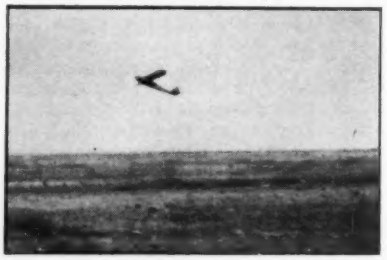
The author is confident that those who undertake and finish the construction of this ship will be well repaid for all the effort put into it. The second part of the instructions follows:

### Wing Panels

First cut out all the parts required, ready to assemble. Cut 12 full ribs from 1/16" sheet stock and 2 from 3/16" sheet balsa. Cut the remaining ribs for the tip area at the same time. Don't forget the necessary holes for the hardwood dowel pins. (Put dowel in after wing panel is constructed.) The leading edge is 5/16" sq., while the trailing edge is ⅛" x ½", tapered. The spars should be very hard balsa, of the same grade used in the center section. The front one is ⅛" x 1", while the rear one is ⅛" x 9/16". The two strips on the leading edge, which prevent the sagging of the doped covering at this point, are 1/16" x ⅛" balsa strips. The wing tips are 1/16" sheet material. To construct a wing panel, slide the ribs on the spars in their approximate positions. Then pin the spars in place and cement the ribs in their correct locations. Follow with the leading and trailing edge, etc. All diagonal wing bracing is ⅛" sq. stock.

When a panel is entirely completed, slide both of the dowel pins in their respective lengths of center section tubing and through the wing panel ribs at the same time. Make certain that the wing panel lines up with the center section *perfectly* in every respect. The wing stubs of the center section should be in perfect alignment, obviously. The importance of this operation cannot be emphasized too much. When satisfied, including sighting down the edges of both the panel and wing stub, cement the dowel pins in place, using metallic cement. When dry, each set of panel pins will be permanently in a correct, fixed position. Next, near the ends of the wing panel dowel pins, as they rest in the tubing in position, drill a hole in each, right through the tubing and dowel together (about 1/16" diameter). These are for the safety wires which are dropped through when the ship is being assembled for flying. It will be necessary also to put balsa strips between the wing ribs (flush with rib surfaces) and install short lengths of ⅛" O.D. aluminum tubing between them and the larger tubing housing the wing panel pins. Do this on top and bottom. When wing is covered, a hole then remains straight through the wing section so that safety pins of aluminum wire can be dropped through and bent over.

What the camera saw from the plane several hundred feet "up."



Here she is taking off with the engine "opened up." Note the climbing angle.

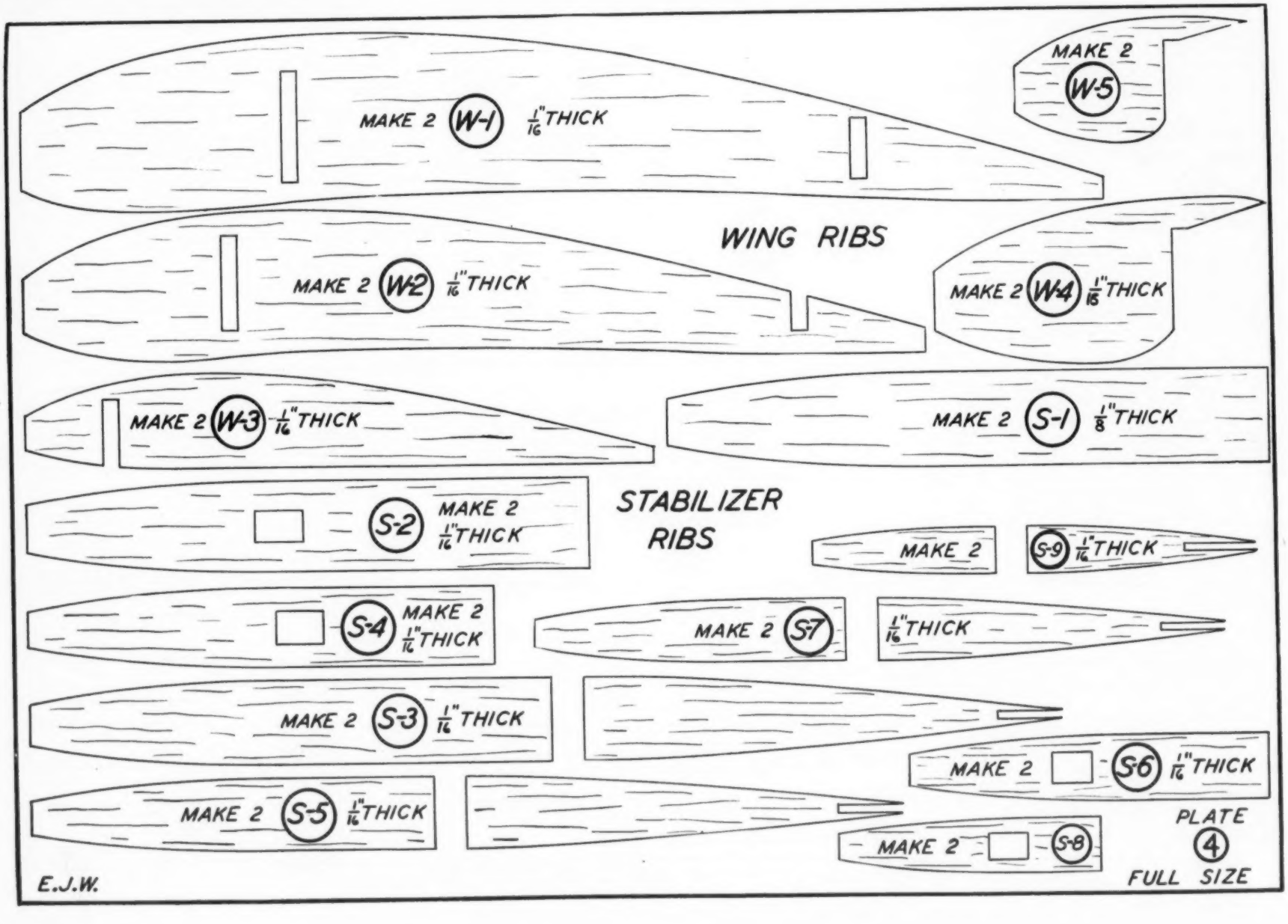
A take off with engine throttled down.

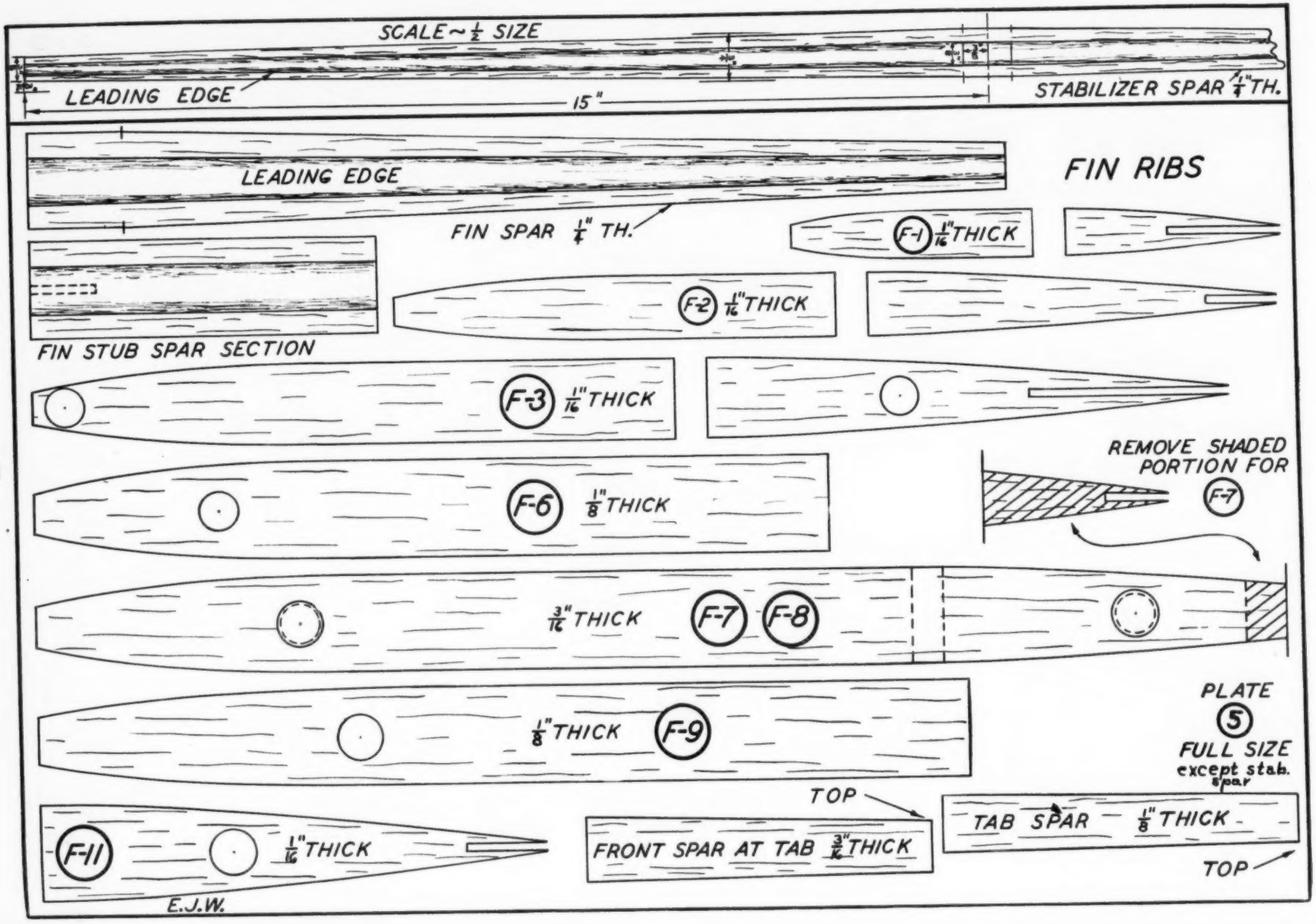
### Tail Surfaces

The construction of this unit is more or less conventional. Both the fin and stabilizer have been designed for maximum efficiency. The rather high position of the stabilizer on the fin adds greatly to the stability. This ship is absolutely guaranteed by its designer not to spiral-dive under power under any circumstances.

First cut all materials for the fin and stabilizer. All ribs are cut from 1/16" sheet balsa, with the exception of several where additional strength is required. To construct either one, first lay down the spar, raising it 3/16" at each end, because of the equal taper to each side of it. Pin in place the leading and trailing edges and also raise them to correct positions from the workbench. The fin and stabilizer tips are 1/16" sheet material. Diagonal bracing is ⅛" sq. balsa. When both are completed, remove a section of rib No. 7 in the fin (just ahead of spar) so the stabi-

*(Continued on page 47)*


MAKE 2 W-1 1/16" THICK
MAKE 2 W-5
WING RIBS
MAKE 2 W-2 1/16" THICK
MAKE 2 W-4 1/16" THICK
MAKE 2 W-3 1/16" THICK
MAKE 2 S-1 1/8" THICK
S-2 MAKE 2 1/16" THICK
STABILIZER RIBS
MAKE 2 S-9 1/16" THICK
S-4 MAKE 2 1/16" THICK
MAKE 2 S-7
1/16" THICK
MAKE 2 S-3 1/16" THICK
MAKE 2 S-6 1/16" THICK
MAKE 2 S-5 1/16" THICK
MAKE 2 S-8
PLATE 4
FULL SIZE
E.J.W.


SCALE ~ ½ SIZE
LEADING EDGE
15"
STABILIZER SPAR ¼" TH.
LEADING EDGE
FIN SPAR ¼" TH.
FIN RIBS
F-1 1/16" THICK
F-2 1/16" THICK
FIN STUB SPAR SECTION
F-3 1/16" THICK
REMOVE SHADED PORTION FOR F-7
F-6 1/8" THICK
3/16" THICK F-7 F-8
1/8" THICK F-9
PLATE 5 FULL SIZE except stab. spar
TOP
F-11 1/16" THICK
FRONT SPAR AT TAB 3/16" THICK
TAB SPAR 1/8" THICK
TOP
E.J.W.

# Proportioning Your Gas Job

Article No. 74

## How the Wing Loading Affects the Proportions For Maximum Performance, and How Large the Tail Surfaces Should Be

By CHARLES HAMPSON GRANT

Chapter No. 5

IN THE preceding article of this series it was shown that the plane that would give the greatest duration, when powered with a ⅛ hp. engine and having a wing loading of eight ounces per square foot, should have a wing area of 7.16 square feet and a total weight of 3.58 pounds.

In many cases, however, model builders may wish to proportion their plane so it will have a wing loading of ten ounces per square foot, as this wing loading is required by the established rules of many contests. The problem, then, is to determine the size and minimum weight of a plane that will give a minimum performance with this wing loading and ⅛ horsepower. The performance chart given on page 13 of the May issue of MODEL AIRPLANE NEWS will give you the desired information at a glance.

On the chart find the ten ounce per square foot line. The point at which this line intersects the *minimum practical wing loading line*, represents the plane in terms of wing area and total weight that will give the greatest possible performance. On the chart the point of intersection gives a value of 4.6 square feet of wing area at the left side of the graph, and 2.87 pounds total weight at the bottom. Such a plane will have a climb of about 780 feet per minute. Its glide will not be as flat as the plane with the lighter wing loading and its sinking velocity will be greater. Thus the duration will be cut down to a small extent.

It can be seen readily that in order to obtain the same rate of climb with the more heavily loaded plane it has been necessary to increase the ratio of power to weight. This could be done by making the plane lighter, the power remaining the same. However, in this event, the wing area would also have to be reduced in order to retain the ten ounces per square foot wing loading. As a result we have a smaller, faster plane with more power for its weight.

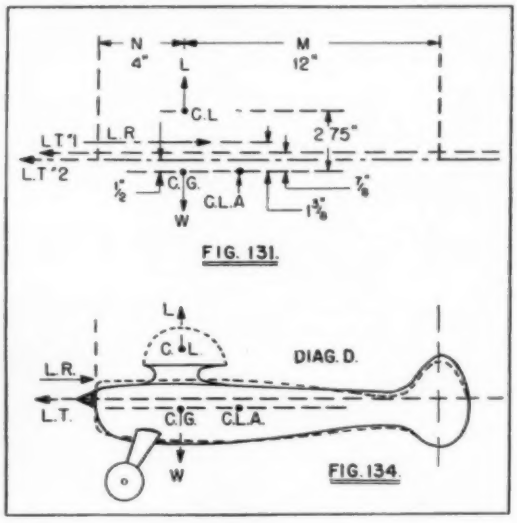


FIG. 131.



FIG. 134.

If you are adverse to small, fast planes for duration purposes, but had rather depend on the capabilities of a larger plane to obtain duration through greater soaring qualities, you may choose to build the first model selected as the best, which is loaded eight ounces per square foot. This plane may be built heavier so it will conform to the ten ounce per square foot rule. In such an event it would have to weigh 4.62 lbs. instead of 3.58 lbs. This may be determined from the graph, which shows that the rate of climb of such a model would be only about 396 ft. per minute.

Nevertheless it is true that larger planes have greater soaring capacity even though the wing loading is the same as smaller planes. The KG is a good example. This plane was a fairly slow climber yet its soaring qualities are well known. In fact, a ten foot KG held the world's record for three years against more lightly loaded ships that tried in vain to equal its time of 64 minutes, 40 seconds, with ⅛ oz. of fuel per pound of weight of airplane.

One of the main reasons for this quality, possessed by large planes, is the characteristics of what is known as the *"Reynolds Number"*. This is a mathematical quality which represents the condition that large areas lift more per square foot than smaller areas, at the same speed.

In order to satisfy a possible difference of opinion among readers that might exist concerning the potential merits of either of the two planes, large or small, the correct proportions for both types will be worked out as we proceed.

Unquestionably the possibilities of what may be done with the larger model are far greater than the smaller one. For instance: 1. It may be made with a wing area of 7.16 sq. ft. and a wing loading of 8 oz. per sq. ft. In this way a maximum rate of climb can be obtained. 2. Its total weight may be increased by means of adding payload to 4.62 pounds, so that it conforms to the 10 oz. wing loading. 3. A larger and more powerful engine may be used to increase the weight to 4.62 pounds, and at the same time obtain a high performance because of the greater power available.

As an example of case No. 3, a Forster Brothers or some other make of large engine may be used. The Forster Brothers

*(Continued on page 50)*

# The Plane on the Cover

By ROBERT McLARREN

EARLY in 1936 the United States Navy began development on an entirely new aspect of naval aviation. This was the combination of two, and even three, separate and distinct tactical aircraft types. Under this plan one ship was to do the work of two or three.

Bombers and fighters became a single plane. Scouts and bombers, torpedoes and bombers, all were incorporated into one plane. Naturally, these ships had to be built stronger, faster and more ruggedly dependable. It did not mean merely installing bomb racks on a scouting plane and calling it a "scout-bomber." It meant designing an entirely new ship, a ship capable of the tremendous load carrying ability of the bomber combined with the speed and fighting ability of the scouting plane. In the past two years we have seen the Vought Scout-Bomber (SBU-1), the Curtiss Bomber-Fighter (BFC-2), the Douglas Torpedo-Bomber (TBD-1), and many other such dual designation ships designed, constructed and flown in large numbers from our navy's sea-going eagles' nests.

It has not been until now, however, that three different types of aircraft have been combined into a single ship. For a period of more than two years the United States Navy has worked in close cooperation with one of the largest and oldest naval aircraft manufacturers on a secret project: a triple-purpose military plane! Only a few weeks ago this deadly craft was rolled from the factory for the first time and placed in the hands of naval test pilots. And that is the ship shown on our cover this month: the Hall-Aluminum XPTBH-2! That threatening designation merely means that this craft is a Patrol-Torpedo-Bomber manufactured by the Hall-Aluminum Aircraft Corporation of Bristol, Pennsylvania.

The XPTBH-2 is a high wing monoplane, twin-engined, seaplane powered by two Pratt & Whitney "Twin Wasp Senior", double-row radial engines developing 860 horsepower each. These engines are completely cowled and mounted into the wing close inboard with cooling flaps, a special exhaust collector ring, and special oil cooler cylinders located in the float strut directly below the engines. The landing

*(Continued on page 56)*

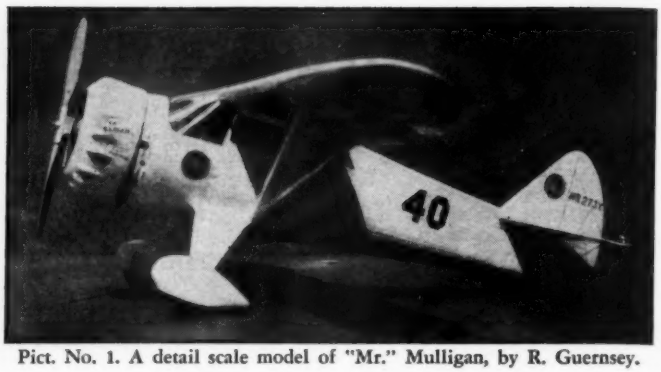
# AIR WAYS

## HERE AND THERE

### What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Tell Others What You Are Doing

## Air Ways Club News

### Let Others Know What You Are Doing




Pict. No. 1. A detail scale model of "Mr." Mulligan, by R. Guernsey.

OUR Air Ways readers have sent a few interesting contributions this month. Due to the unsettled weather most of the activities of model fans have been confined to workshops and clubrooms. However, this is an essential part of the model game and scale model fans have been unusually busy during the winter.

The picture which rates "first" for this month is No. 1, sent to us by Ralph Guernsey of Posey, California. In it is shown a ¾" scale model of the "Mr." Mulligan. It is constructed entirely of balsa and its appearance has been improved by the use of wood fillers, which make the surfaces treated in this way very smooth and shiny. Mr. Guernsey apologizes by saying that this is one of his older models, and that he will send a picture of one of his latest jobs very shortly. We feel that no apology is needed, as the craft in the picture displays a high quality of workmanship. The wing is composed of a built-up frame covered with 1/32" balsa sheet. It has a completely equipped cabin with dual controls. All the control surfaces are operative. There is even a brake lever which operates the brakes on the wheels. Guernsey says that building the controls of this model was the hardest job of any he has tackled, as they required the use of rods and bell cranks extensively. All the decorations and lettering was done by hand.

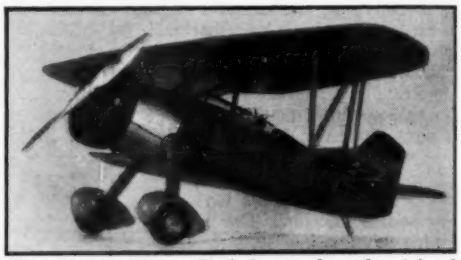
Next we have a picture, No. 2, of a twelve inch solid scale Goshawk. Henry Clark of 46 Fort Washington Avenue, New York City, is responsible for this one. He says:

"After getting out of a tangle of gas models, I managed to sit down and build the model shown in the picture. The cockpit is carved out and fitted with a moderate number of controls. A dummy pilot, detailed fully, was placed in to add realism. It's a smooth job, and although I did not get around to putting in the flying and landing wires, the ship still looks good. The engine is assembled of individual parts too, and not some cheap celluloid affair."

Our trick photographers are at it again! Picture No. 3 shows a model Ryan ST Sportster, believe it or not. J. Reese Conoly of Sylvester, Georgia, P. O. Box 123, the builder of the plane, tells us that this is the first picture of this kind he has attempted but he does not say how he imposed the figure of the young lady so realistically against the plane. He says that the plane has about everything except a fire extinguisher. Conoly actually made one but it was so small that when he wished to assemble it in the plane he couldn't find it!! That is what we call getting down to pretty small sizes. The wing span of the ship is 22½ inches and it weighs two ounces. It required about ninety hours to build.

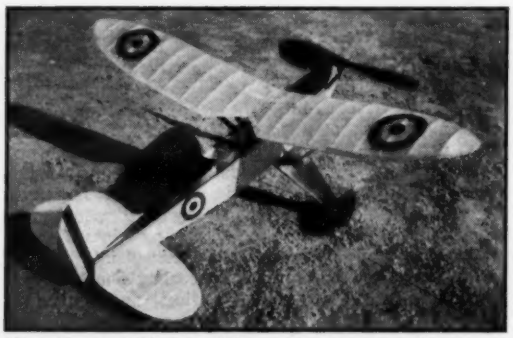
Some of our readers may recognize the ship in picture No. 4 as a model of the Renard R-31, plans for which were given in the December issue of this magazine. This ship was built by Andrew Peterson of 2817 Michigan Avenue, Los Angeles, Calif., who makes some very interesting comments concerning it:

"The plans in the magazine were for a twelve inch model. However I enlarged the ship to thirty inches. The model proved an excellent duration plane, winning top honors in both of the contests in which it was entered. The highest time to date is



Pict. No. 2. Henry Clark has made a fine job of this solid scale Goshawk. Note the realistic propeller.

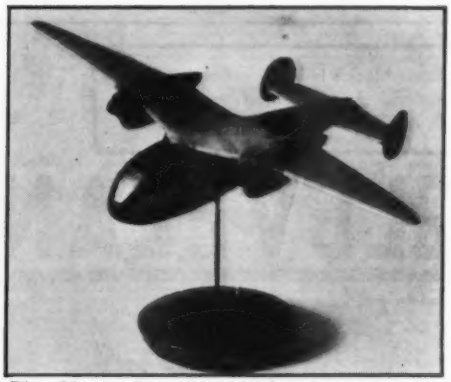
Pict. No. 7. Dolores Condon takes a tip from papa's Boeing, and enjoys some "spar" ribs for her luncheon.



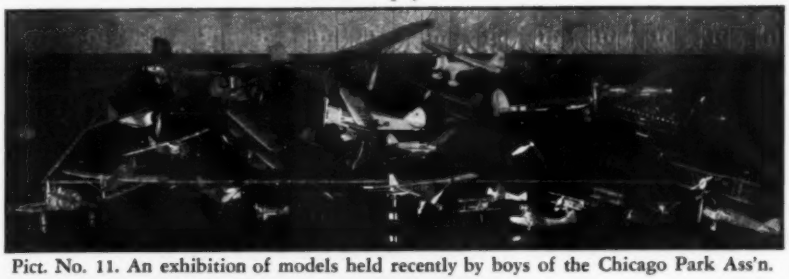
Pict. No. 4. This 30" flying scale Renard, built by Andrew Petersen, has flown for 2 min., 48 sec.


Pict. No. 5. A display of all kinds of models, in the window of the Bent Cycle Shop, entered in a contest held recently at Green Bay, Wisconsin.

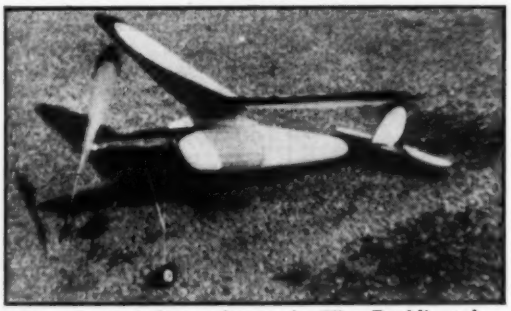
Pict. No. 10. The French Wakefield team in England last year. L. to r., standing: Robert, Chabot, Fillon, Blanches. Kneeling: Ducrot and Desnoes. M. Fillon won the trophy.



Pict. No. 9. Here is a solid scale replica of a "dream" racer. Mr. H. Bodger had the dream.



Pict. No. 11. An exhibition of models held recently by boys of the Chicago Park Ass'n.



Pict. No. 8. A fine performer, by Wm. Bouldin 3rd.

two minutes, forty-eight seconds. It carries a twelve inch prop and weighs 3½ ounces. A marked degree of stability is noted in this flying scale job."

This should serve as a "tip" to our readers. Those who are looking for a contest flying job had better get out their old M.A.N.'s and give this plane a second look. Judging from the performance it has turned out, this is one of the finest flying scale jobs we have heard of.

Picture No. 5 shows a display of models in the window of the Norman Bent Cycle Shop, 111 Main Street, Green Bay, Wisconsin. These models were all entered in a contest held on March 5th. There were 75 entries. Another contest was held in Green Bay on May 3rd.

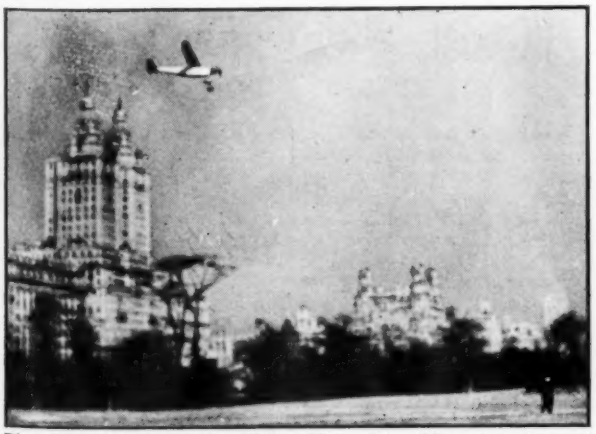
Picture No. 6 is rather an unusual shot. It might be a Lockheed or some other large plane flying over New York City. However it is merely the Grant Wakefield model, built by Felix Gutmann of 710 Ninth Avenue, New York City, "gliding in" over the "sheep meadow" in Central Park, in this city. Some of the tall buildings of the city may be seen in the background. Gutmann claims that on the trials a glide of 15 to 1 was obtained. Judging from the attitude of the ship in the air, we would say that he was not far wrong. Detailed plans for this plane are given on pages 16 to 20 of this issue. Up to the present time full flight trials have not been given this model, but it performed so well with only about 200 turns that Gutmann expects a great deal from it.

One of the curious things about the plane is that it will fly perfectly straight without any tendency to turn, due to propeller torque. By turning the rudder one way or the other, the ship may be made to circle as desired. Your editor ventures to explain the secret of this. It lies in the fact that the fin is large enough but not too large. Since model builders have realized that large fins produce stability they acted according to the false impression that the larger the fin the better. This is not true. Whereas a large fin prevents spinning, if it is too large it induces other difficulties; such as sensitivity to any torque generated by the propeller. If the fin is just the right size, propeller torque will have very little, if any, effect upon the model in respect to making it turn.

We will be glad to have comments regarding the performance of this plane from those who undertake to build and fly it.

James Condon of 100 Mount Pleasant Avenue, Newark, New Jersey, believes in starting the aeronautical education of his children at a young age. If they cannot make airplanes, he feeds them planes. In picture No. 7 we see his young daughter, Dolores, nibbling on a few "spar" ribs of a Boeing pursuit job, built by her dad. Possibly this is a good way to acquire the aviation spirit; that is, through the mouth.

*(Continued on page 37)*



Pict. No. 6. The Grant Wakefield model gliding into Central Park, N. Y. City. It has a steep climb and a flat glide.

Pict. No. 3. A model young lady and a model Ryan ST put in the same picture by a trick of the photographer, J. R. Conoly.

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The Stinson, however, includes a well turned cowl front, and fuselage front the balance of the cowl being easy to make, the same as are all COD's, and on the Rearwin, besides the solid nose block, a shaped leading edge is supplied.

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"The Modelmaker's Bible" Issues 1, 2, 5, 6, 7 of the invaluable CLEVELAND MODELMAKING NEWS are still available at 25c per issue. Or complete set, including issues 3 and 4, for only $1.50. It's really a textbook in magazine form. Every issue worth many times its cost. Free in each issue 2 or more big C-D airplane plans.

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**When ordering, be sure to include 15c additional for packing and postage on liquids,** as these constitute parts, whether with or without kits. Shipments will not go forward unless the 15c is included. For example; in ordering Dry Kit SF-1 say: "Please send me the Dry Kit SF-1 at $1.95 and SF-1 Liquids at 63c, plus 15c packing charge—a total of $2.73."

Spans of SF, ¾" scale Kits run from 12" to 55⅝"; D, ½ scale Kits, from 9" to 42¾", Reps 20" to 28".

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| 4 | Curtiss "Jenny" | 2.65 | .90 | | |
| 5 | Laird Super-Solution | 1.95 | .58 | .65 | |
| 6 | Polish Fighter | 2.00 | .52 | | |
| 7 | Curtiss Helldiver | 2.95 | .89 | | |
| 8 | Army Boeing P12-E | 2.25 | .69 | .80 | |
| 9 | Scouting SE-5 | 1.25 | .42 | .55 | |
| 10 | Sopwith Camel | 1.95 | .51 | | |
| 11 | A-W Quad Fighter | 1.95 | .58 | .65 | |
| 12 | Bishop's Nieuport | 1.95 | .58 | .65 | |
| 13 | Spad 13 | 1.95 | .58 | .65 | |
| 14 | Fokker Triplane | 1.95 | .69 | .65 | |
| 15 | Fokker D-7 Fighter | 2.50 | .87 | .75 | .65 |
| 16 | Albatross D-5A | 1.95 | .63 | | |
| 17 | Bayles' Gee-Bee | 1.95 | .53 | .65 | |
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| 26 | Heath Parasol | 1.25 | .42 | .35 | |
| 27 | Doolittle's Gee-Bee | 1.95 | .57 | .65 | |
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| 33 | Comper Swift Sport | 1.25 | .42 | .45 | |
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| 35 | Boeing 247 Transport | 5.95 | 1.45 | 2.95 | |
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| KIT NO. | MANUFACTURERS AND DESIGN TITLE | SF ¾" Scale | SF Liquids only | D's ½" Scale | REPS 20" Span |
|---|---|---|---|---|---|
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| 38 | Buhl Bull Pup | 1.65 | .59 | | |
| 39 | PJ P-16 Fighter | 1.75 | .87 | | |
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| 41 | Vought Corsair V-65 | 2.95 | .85 | 1.10 | |
| 42 | Howard "Ike" | .95 | .42 | .35 | |
| 43 | Douglas O-38 Obs. | 2.95 | .96 | 1.10 | |
| 44 | Page's Racer | 1.95 | .52 | | |
| 45 | Martin Bomber | 6.50 | 1.88 | 2.95 | |
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| 47 | '33 Wedell's W. Wms. | 2.35 | .87 | .65 | |
| 48 | '34 Turner's W. Wms. | 2.35 | .87 | .65 | |
| 49 | Curtiss F11C-2 | 2.95 | 1.09 | 1.10 | |
| 50 | Curtiss Export Hawk | 2.95 | .95 | 1.10 | |
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| 52 | "Mr. Mulligan" | 2.35 | .84 | .65 | .65 |
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| 59 | Hawker Low Wing Fight. | | | | .65 |
| 60 | Boeing P-26-A | 2.65 | .82 | 1.10 | |
| 61 | Seversky Fighter | 2.65 | 1.07 | 1.10 | |
| 62 | Custom Waco C6 | | | 1.10 | |
| 63 | '36 Caudron Racer | 1.95 | .57 | .65 | |
| 64 | Beechcraft C-17-B | | | 1.10 | |
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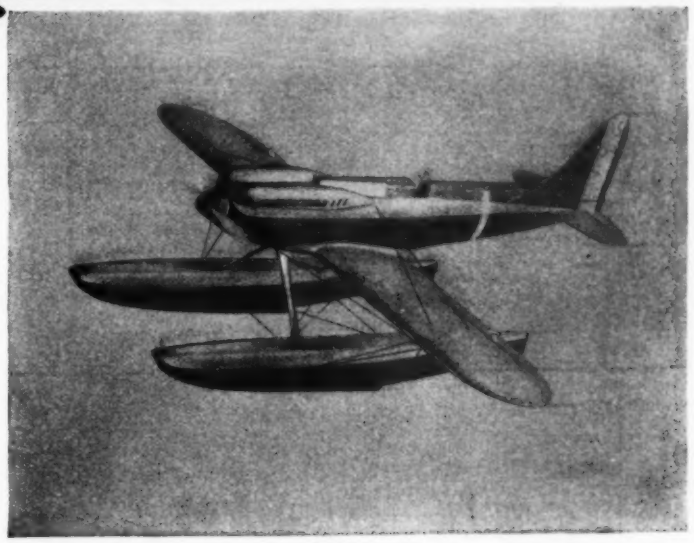
# CLEVELAND MODEL & SUPPLY CO., INC.

★ *Model Engineers Sin[ce] 1919*

★ ★ ★ ★ **CLEVELAND "AIR-ISTOCRATS" Win More Prizes and More Honors Than [All] Othe[rs]**

There's More Sport, More Knowledge Gained, More Genuine Satisfaction in Building One C-D—Than a Dozen Ordinary Aeroplane Models. If You've Never Built One, Don't Postpone the Fun Another Day. Start Now.

# "AIR-ISTOCRATS"



**NSON RELIANT GAS-POWERED MODEL**

coloring to be all silver with blue trimmings, black lettering. Span 82". ...ain and details $2.25, deductible from complete kit purchase price (less ...rchased within 10 days. Kit GP-66, postfree in U.S. only..... **$8.50**

## ...lying Sport this Summer!

**Use any ¾" or ⅞" Bore Motor**

...able for any motors of ⅜" to ⅞" bore, (Baby Cyclone, Brown Jr., Ohlsson and others). ...rmance may be expected with motors of the largest size, but may be smaller. ...ain mid without the power unit, as is standard practice; we have also eliminated supply- ...al wheel shoes where designs require) to enable the model builder to select whatever ...in fancy; and because many do not like wheel shoes on gas models. These may be ...antity, if desired. For instance, for these models we have developed 3½" balsa ...rome bearings at only 65c per pair. Wheel shoes to suit either model also available. ...four routed out cavities, drilled to fit up to 3½" wheels, only 95c. Of course M & M, ...pre wheels may also be employed (3¼" size, $1.50; 3½" size, $3.50). Larger wheels ...employed if wheel shoes are not used. These, like All C-D kits, are dry—there are no ...ots or dopes) supplied, but if you do not have any liquids on hand when purchasing ...models, we recommend buying at least ½ pint of the balsa wood cement (35c, plus 15c ...e) to start. Thus you have your own choice of any colors in the dopes you require and ...quantity you may buy as little or as much as you like.

**(For additional prices see also box at left below)**

**...IGHTER, P-35**

...lue fuselage, yellow ...ed with red stripe ...may be extended ...ition. Super com- ... **$2.65**

**New C-D P26-A Fighter**

This Army design is dazzling with its yellow wings, blue fuselage and gorgeous red and white scallops and stripes. Radio antennae adds unusual smartness. High speed flyer. Span 21". Dry Kit SF-60, complete except no liquids, only.... **$2.65**

## For Water Sport this Summer Build

### This Swift Flying SUPERMARINE S.6B

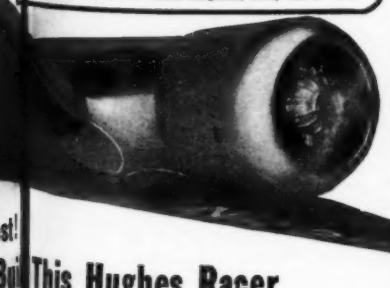
*"Takes off water at a Surprisingly High Speed"*

Here's a seaplane that makes summer vacations something to be remembered. It's a startling realistic model of the famous plane with which England won the Schneider Trophy, and whose speed record is 415.2 m.p.h. Span is 22½". When colored gleaming aluminum and blue, with the many C-D authentic details such as dynamic balances on ailerons and rudder, she's sure a real beauty. Order it without fail today, so you'll have it ready next time you go near water—or in tall grass. Complete Dry Kit SF-19 (no liquids), only ..... **$1.95**

Dry Kit D-19 (no liquids), only ..... **80c**

## ...s "REP" Models

...the most famous of C-D's 12 "REP" models listed in ... All these models are semi-authentic—designed to a ...ther than true authenticity. As summer flyers, and ... models, they are hard to beat. All Kits are complete— ...none contain liquids. Real bargains, every one of 'em!



**GR. LAKES SPORT TRAINER**

Span 20". Very pretty. Sug. col: orange and cream. Dry Kit SF-1, only..... **$1.95**

**HOWARD RACER "IKE"**

Good beginners model. Span 15⅝". Sug. col.: all white. Dry Kit SF-42, only..... **95c**

**My Compliments to Cleveland Model**

I am writing you in appreciation of the wonderful kits you produce. I have built only two of your planes, a Boeing F4B3 and a Curtiss Hawk P.6.E. The Curtiss Hawk won 1st place in the California State Fair Championship last September. I can truthfully say that in my ten years model building experience I have never seen so much detail incorporated in one plane.—T. B., Sacramento, Calif.

The "Douglas Transport" kit which I received from your company has given me complete satisfaction. By all means my next kit will be a "C-D."—E. K. L., Erie, Pa.

**THE CLEVELAND AMPHIBION**

**AN AMPHIBION NEVER YET EQUALLED**

The "perfect" kit for warm weather fun, especially for vacations. Will take off water as easily as water rolls from a duck's back and that's mighty fast. Long steady flights are always to be expected. Twin motors. Span 28". Will also R.O.G. as the wheels are quickly dropped. Without liquids. Kit R-X5001, only..... **65c**

**SPECIAL GRUMMAN "GULFHAWK"**

**MAJOR AL. WILLIAMS FAMOUS SHIP**

It is beautifully detailed, colored orange and striped in blue with a white outline. Flies very well. Both stationary and retractable landing gear. Complete Dry Kit R-70, only..... **85c**

**"MR. MULLIGAN"**

This really is a "beaut" for flights, and a typical C-D authentically detailed job. In big demand, as it is one of the easiest of Cleveland-Designed kits to build. All white. Kit R-52, only..... **65c**

## This Hughes Racer

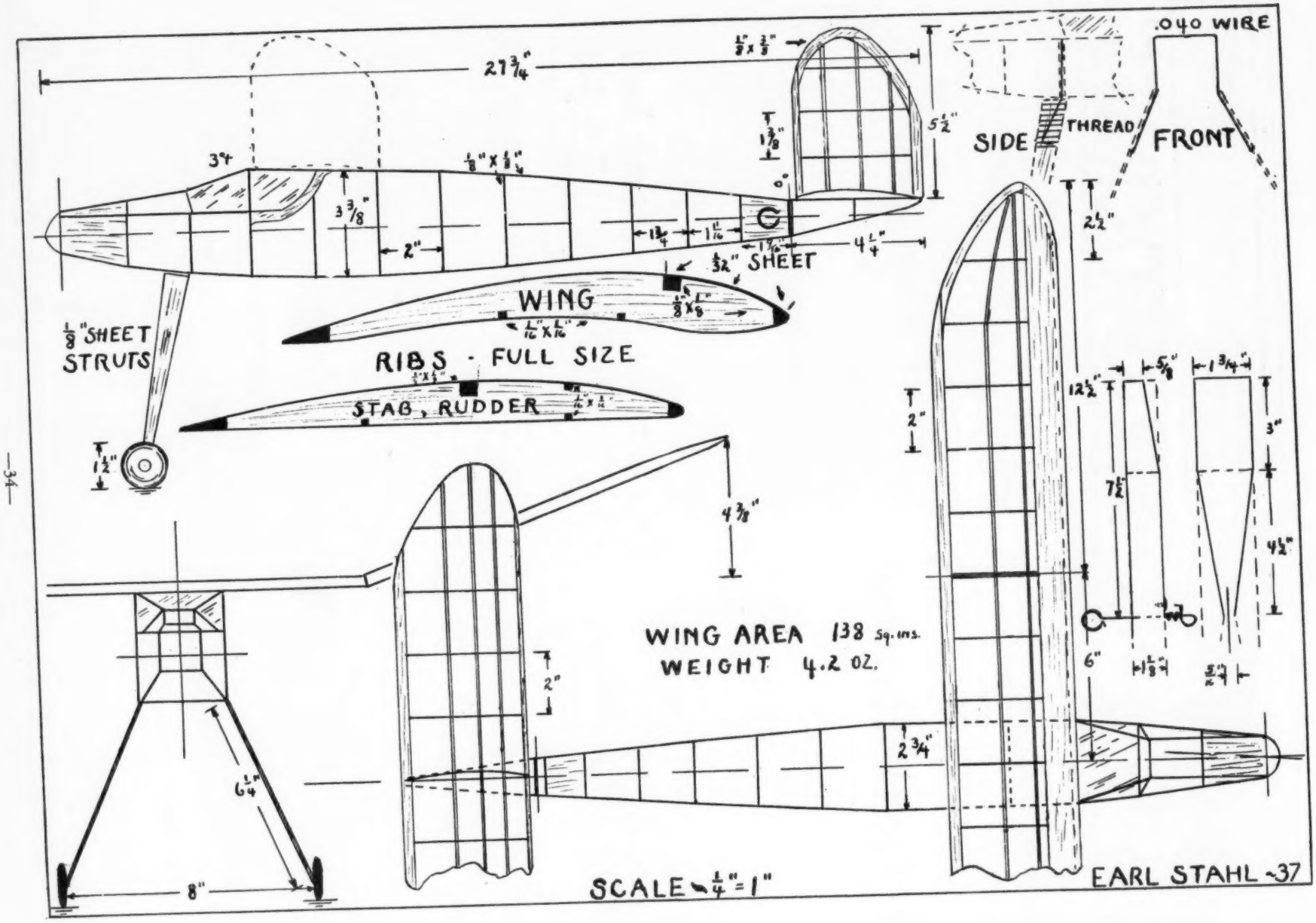
...developed. The real plane itself is the sensation of ...ment, it had so impressed the army that its design ...nearest approach yet to a rocket ship. The realistic ...ig plane—swift as a split second with its beautiful ...ant to delay building—you can ...word in streamlining (if results ...fuselage and tail and blue wing ...are all C-D Kits, for only..... **95c**

**DOOLITTLE'S GB SUPERSPORTSTER**

Span 18⅝". Sug. col.: white, red scalloping. Dry Kit SF-27, only..... **$1.95**

...919 ★ **4508-B50 Lorain Avenue, CLEVELAND, OHIO, U.S.A.**

**...Other Line of Models in the World—THERE'S NONE BETTER FOR YOU ★ ★ ★ ★**


.040 WIRE
27 3/4"
5 1/2"
1 3/8"
SIDE
THREAD
FRONT
2 1/2"
3"
2"
4 1/4"
1/32" SHEET
WING
1/8" SHEET STRUTS
RIBS - FULL SIZE
STAB, RUDDER
1 1/2"
4 3/8"
12 1/2"
5/8"
1 3/4"
7 1/2"
4 1/2"
WING AREA 138 Sq. ins.
WEIGHT 4.2 OZ.
6"
2"
2 3/4"
6 1/4"
8"
SCALE 1/4" = 1"
EARL STAHL -37

# A Weight Rule Contest Model

## Here Is A Reliable Contest Model of Three Ounces Per One Hundred Square Inches of Wing Area That Is Easy to Build

By EARL STAHL

**If You Like This Model Write Us**

**The completed model takes off with little power and is very stable.**

A GOOD contest model need not only be capable of making long flights, but it should be stable, durable and sufficiently powerful various conditions encountered in contests. In order to accomplish this the model must be stable, durable and sufficiently powerful to carry it to high altitudes.

Simplicity and flying ability are the key notes of this plane. Its construction is entirely conventional, and it is easy to adjust and fly. Its stability and power permit it to be flown in any weather.

The planes and instructions presented here are for building a plane to the new N.A.A. weight rule of three ounces per 100 square inches of wing area, but if a model of the old weight rule is desired it can be had by simply making the entire structure slightly lighter, reducing the power, and using a slightly larger propeller. This plane is an adaptation of just such a model.

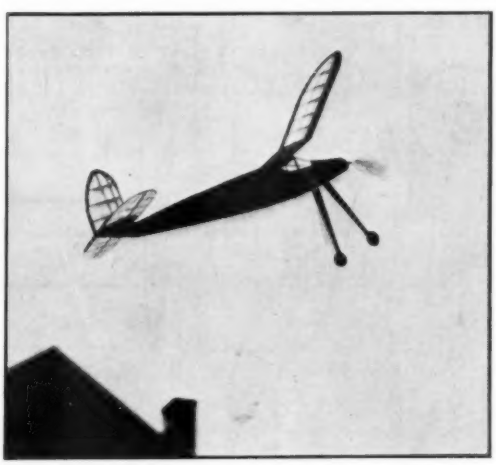
Before starting construction it is advisable to make a full size plan. Since the drawing is one-fourth actual size, a full size construction can be made by enlarging four times with the aid of dividers. The fuselage top has three degrees of built-in incidence where the wing sets on, and zero degrees where the stabilizer is attached, so great care should be exercised to make this correct.

### Fuselage

The whole fuselage is constructed of hard balsa. The two sides are constructed one over another in order that they be exactly alike. Join the sides together with 1/8" square spacers and glue on the front formers. Bend the wire landing gear fitting, and secure it to the fuselage with thread at the position indicated. Cut the removable tail piece from the fuselage, and glue several laminations of 1/16" sheet into place to provide an anchor for the rear hook which is made from .040 or larger diameter wire. This book incidentally should be protected by rubber tubing to prevent cutting the rubber motor, and it should have a hook on its end which will make it possible to lock it. Finally glue a piece of 1/8" sheet balsa to the front of the tail piece so it will fit snug to the rear of the fuselage, and keep the tail from turning when the motor is wound. The shaded parts of the fuselage, both front and rear, are filled with 1/16" sheet balsa for additional strength, and to provide a place to hold when the motor is being wound.

### Wings and Empennage

The wing and tail surface construction is very similar except that the wing is built and covered in three separate pieces. Nineteen wing ribs are cut from 1/16" sheet balsa, and the medium hard spars attached. The tip ribs are trimmed to shape and size, and the tip outlines are cut from 1/8" sheet. The whole leading edge on the top is covered with 1/32" balsa as shown on the plans. The tail surfaces are constructed in a like manner except that they haven't any sheet balsa covering. Note that the tips of the stabilizer are 1/16" square bamboo. Be careful to have the rudder constructed so the flat side of the airfoil will be on the right of the model when the rudder is mounted.



**The plane gains altitude quickly and has a flat glide. Here it is in full flight.**

### Finish and Covering

Much of the plane's beauty depends on a neat, attractive covering job. The entire structure is sanded thoroughly to aid in making a good job. Cellophane is glued to the windows, and the individual units are covered with tissue, using banana oil as an adhesive. Select contrasting, visible colors such as red and yellow; black and yellow, or others, for this plane. When covering put adhesive on the extreme outlines of the frame only. If any wrinkles are present they can be removed more successfully if this procedure is followed. One exception should be noted however. On the under-surface of the wing the paper should be attached to each rib and spar to preserve the airfoils' shape. Water spray each piece and pin them to a flat surface to prevent warping. Every tissue-covered part is doped with two coats of light dope ar banana oil.

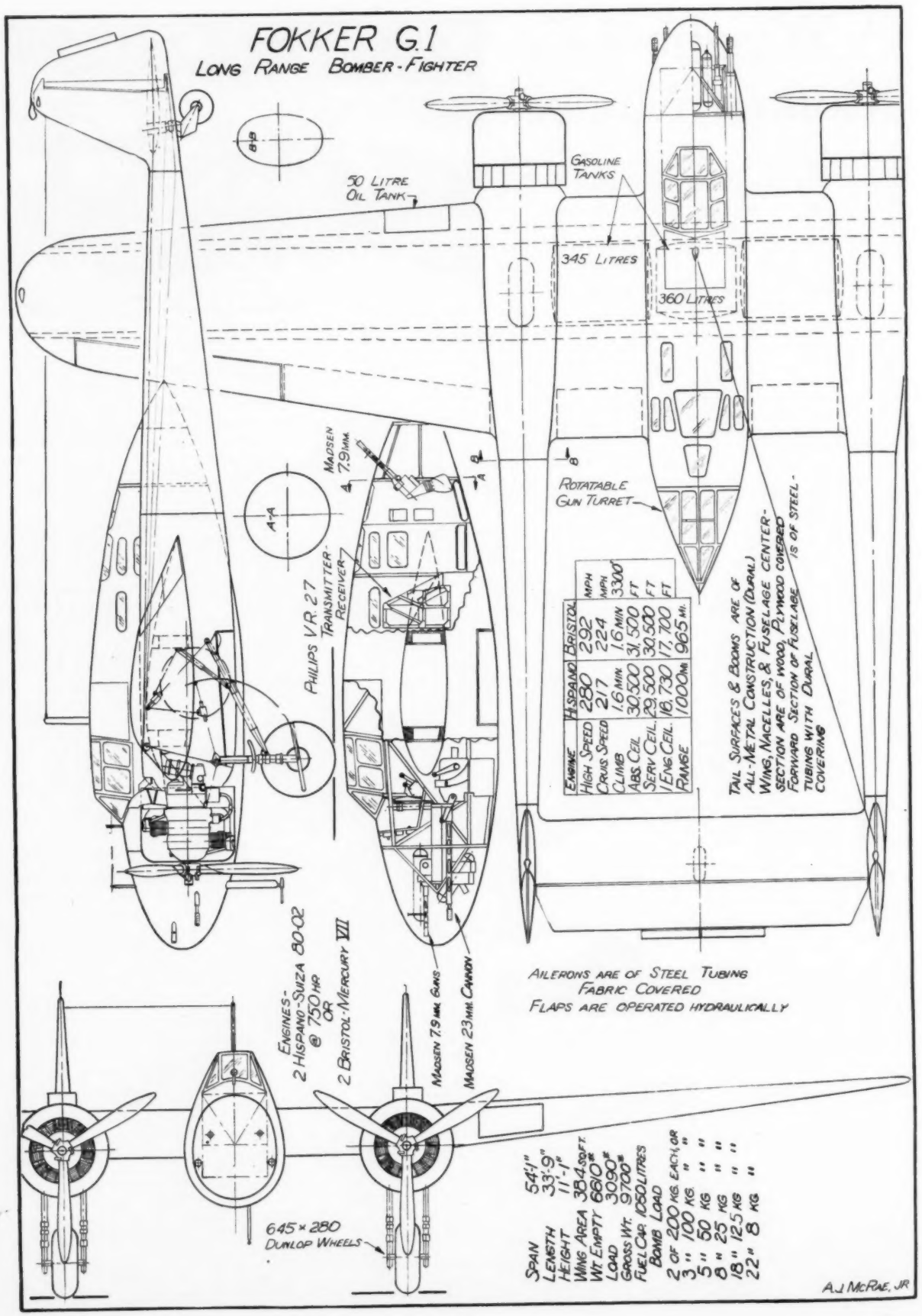
The landing gear should now be finished. The struts are cut from 1/8" balsa (hard) and sanded to a streamlined shape. Hard wood wheels are attached by using .034 music wire axles which are bound to the struts with thread. The tops of the landing struts are bound to the protruding wire fittings of the fuselage. Be neat when binding anything with thread! This landing gear will prove very shock absorbent and prevent damage to the plane.

The various units may now be assembled. The outer wing panels are raised at their tips to the indicated dihedral, and the joints are glued securely. This dihedral may seem excessive, but the plane will not climb in tight circles without it. The rudder is glued atop the stabilizer; the flat side parallel to the center rib. Next the unit, rudder and stabilizer, is glued to the tail piece; the rudder's flat side being exactly parallel to the fuselage's center line. Glue small hooks to these two units, fuselage and tail piece, so they may be held together with rubber bands. A 1/8" flat rubber band holds the wing on.

### Propeller

Much of the model's success depends on the propeller. Cut the blank from hard balsa to the shape shown. A right hand propeller is cut. Some under-camber is cut into it. Round the tips, and the sand the prop well. Use four or five coats of dope for polish; sanding lightly between coats. The nose plug is also made from hard balsa. The hole through the plug is drilled as the plans indicate so that the prop will pull slightly to the right. Washers are glued over the holes at either end to fix the line of thrust. A piece of 1/8" sheet is glued to the back of the plug so it will fit to the fuselage. The propeller shaft is bent from .040 wire or larger, and it should be covered with

*(Continued on page 49)*


FOKKER G.1
LONG RANGE BOMBER-FIGHTER
50 LITRE OIL TANK
GASOLINE TANKS
345 LITRES
360 LITRES
MADSEN 7.9MM.
PHILIPS V.R. 27 TRANSMITTER-RECEIVER
ROTATABLE GUN TURRET
ENGINE | H.SPANO | BRISTOL
HIGH SPEED | 280 MPH | 292 MPH
CRUIS SPEED | 217 MPH | 224 MPH
CLIMB | 1.6 MIN 30,500 FT | 1.6 MIN 31,500 FT
ABS CEIL. | 30,500 FT | 30,500 FT
SERV CEIL. | 29,500 FT | 30,500 FT
1 ENG CEIL. | 16,730 FT | 17,700 FT
RANGE | 1000KM | 965 MI.
TAIL SURFACES & BOOMS ARE OF ALL-METAL CONSTRUCTION (DURAL.)
WING, NACELLES, & FUSELAGE CENTER-SECTION ARE OF WOOD, PLYWOOD COVERED
FORWARD SECTION OF FUSELAGE IS OF STEEL-TUBING WITH DURAL COVERING
AILERONS ARE OF STEEL TUBING FABRIC COVERED
FLAPS ARE OPERATED HYDRAULICALLY
ENGINES- 2 HISPANO-SUIZA 80.02 @ 750 HP OR 2 BRISTOL-MERCURY VII
MADSEN 7.9 MM. GUNS
MADSEN 23 MM. CANNON
645 × 280 DUNLOP WHEELS
SPAN 54'1"
LENGTH 33'-9"
HEIGHT 11'-1"
WING AREA 384.30 SQ.FT.
WT EMPTY 6810 KG
LOAD 3090 KG
GROSS WT. 9700 KG
FUEL CAP. 1080 LITRES
BOMB LOAD
2 OF 200 KG EACH, OR
3 " 100 KG " "
5 " 50 KG " "
8 " 25 KG " "
18 " 12.5 KG " "
22 " 8 KG "
A.J. McRAE, JR.

## Air Ways

*(Continued from page 31)*

However we have yet to receive definite information concerning the results of Mr. Condon's experiments with his daughter. We hear from Condon that in a few years he expects his daughter to be "strutting her stuff."

Every so often our old friend, Mr. William Bouldin, 3rd, of 169 Prospect Street, East Orange, New Jersey, flares into activity; or perhaps we should say that we hear of his activities occasionally, for it appears that all his spare moments are spent in building models. One of his latest jobs is shown in picture No. 8. It is a racy looking job and Mr. Bouldin says it has an unusually fast climb and is very stable.

Here is an interesting point concerning the performance of different types of models: Parasol wing jobs usually climb exceedingly well but are not much for speed. Low wing planes are set up so that they assume an altitude in flight which induces high speed but a relatively poor climb. By this we do not mean that low wing ships will not climb well, some will; but parasol models will climb much better under given conditions. This is largely due to the fact that on parasol jobs the tail generates lift, while on low wings there is a down pressure on the tail which load must be carried by the wings in addition to the weight of the model.

The little ship shown in the picture has a span of thirty-two inches and sports a twelve-inch prop. It is driven by ten strands of ⅛" flat rubber. Judging from the performance and the number of strands used, we would make an estimate that the weight of the ship is 2¼ to 2½ ounces.

Mr. H. Bodger of 4007 Ingraham Street, Los Angeles, Calif., has been inspired to build solid scale models of original design. Picture No. 9 shows one of his creations. It is supposed to be a twin engine Bendix and Thompson racer. Two pilots may be seated in the nose (of the big ship) in tandem fashion. An aisle is supposed to lead from the door on the side of the ship to the pilot's compartment. The large ship is to have a thirty-two foot span and is to be driven by two Menasco 350 hp. engines, mounted at the apex of the gull wings. Mr. Bodger claims that the speed of such a ship should be equal to 320 miles per hour. In order to determine correct speeds and performance it is necessary to go into a great deal concerning the design and structure of an airplane, otherwise it is merely a guess. Mr. Bodger, however, says he figures this performance by comparing it with existing ships.

### Original Design Contest

We believe one of the most interesting pastimes is the making of models of original designs. It proves to be a wonderful outlet for one's ideas and often shows up faults in conception. In fact, MODEL AIRPLANE NEWS thinks so well of following this branch of model building that it will publish the picture of the ship of the best original design sent to us each month. An award of $5 will be given to the winner each month. The models will be judged in respect to their practicability as well as their originality. In other words, a ship may embody a very original idea but obviously it might be impossible to built it or to obtain proper flight characteristics from it under flight conditions. The models will be criticized each month in respect to their worth. So, readers who have ideas should get busy!

Only pictures will be printed which are excellent photographs and which are of a quality which may be properly reproduced. Snapshots of mediocre quality will not be considered inasmuch as such pictures, when they are reproduced, do not often do justice to the object they are intended to show.

## MODEL NEWS FROM OTHER COUNTRIES

### France

We hear from J. Desnoes of 100 Avenue Kieber, Paris 16 eme, France, who was a member of the 1937 French Wakefield team. Mr. Desnoes sends picture No. 10 of the French team taken in England Left to right, standing, are: Robert, Chabot, Fillon, Blanches. Kneeling: Ducrot and Desnoes. The young lady evidently was not a member of the team. As readers probably know, the 1938 Wakefield contest will be held in France, and Mr. Desnoes assures us that a great reception will await Americans who are able to make the journey and fly their ships there.

### New Zealand

In our December issue Mr. G. S. Smith, Brougham Street, New Plymouth, New Zealand, made a number of comments concerning the relative merits of English and American planes used in his country. Mr. Robert R. Fisher of Cambridge, New Zealand, writes us now and takes exception to his remarks. He tells us that Mr. Smith has misinformed us in regard to civil aviation in New Zealand. Mr. Fisher writes as follows:

"In one paragraph Mr. Smith states: 'Many airways were planned but until the ban on foreign planes was lifted only one service bought English.' This is incorrect. To begin their services East Coast Airways bought D.H. 'Dragons'; Cook St. Airways bought D.H. 'Rapides'; Air Travel bought D.H. 'Fox Moths'; and Union Airways bought D.H. 'Air Expresses' and a Miles 'Falcon'.

"American machines did not make their appearance until Union Airways bought three Electras, when they extended their service from Palmerston north to Wellington and Auckland. In other words; 100% of New Zealand Airways started with British aircraft and so far only one company has bought American machines, which are used with British machines.

"In regard to the 'bad weather and cold feet' rubbish, I may say that even an Electra has turned back because of unfavorable climatic conditions. The explanation is that transport bad weather flying in New Zealand has not yet reached a state of advancement as in the United States. Therefore irrespective of the machine they are flying, the pilots turn back.

"Smith also says 'In Australia, as well as in New Zealand, both governments did not allow any foreign planes to compete with the British.' Wrong! The ban on U.S. aircraft was purely a 'red tape' misunderstanding. That is, the bureau that issued air-worthiness certificates in the U.S. was not recognized in Australia and New Zealand. It will be remembered that U.S. competitors in the Centenary Air Race had this difficulty to contend with. However the difficulty has been removed and if foreign aircraft suit our purposes better than British aircraft, we buy foreign, but this is very seldom.

"Mr. Smith's remarks give the casual reader the impression that American machines have swept the British machines aside and are being used almost exclusively. I will let the following facts speak for themselves. The American machines in New Zealand consist of:

Three Lockheed Electras, one each of Beechcraft, Monocoupe, Taylor Cub, Rearwin Sportster (on order). There are also one or two Porterfields (on order), and two or three Wacos.

"The rest of the machines; military, transport, sport flying and training in New Zealand, are British.

"Smith also states, 'In Australia every D.H. passenger transport crashed or fell to pieces flying under normal flying conditions, until there was such a loss that the government lifted the ban on foreign machines.' I have pointed out previously that the latter part of the paragraph is incorrect, but in regard to the unjust criticism of the D.H. Air-Express type, I would like to make a few remarks. Several of these machines were flown out from England to Australia through extremes of climatic conditions. Now, if a machine can fly 12,000 miles, why should it 'fall to pieces' on a short run? Two of the three crashes that led to the temporary cancelling of all flights in D.H. Air-Expresses occurred over Bass Strait under similar conditions as that of the ill-fated 'Samoan' clipper."

### Egypt

We hear from the National Flying Corporation. The announcement we received says:

"We have the honour to inform you that an association under the name of 'National Flying Corporation' has been formed with its head office at the following address: 7 Sharia Fuad 1st, Cairo, Egypt.

"The object of this association is to meet the many needs in air matters in this country, and establish a library containing recent books on aviation, illustrated papers, statistics, etc., to be at the disposal of airmen."

## CLUB NEWS

### Illinois

Picture No. 11 shows an exhibition of models at the Logan Theatre, Chicago, Illinois. The exhibit was a preamble to an airplane meet held at Kosciuszko Park, Saturday, February 5th, 1938. This was the second annual indoor contest in section four of the Chicago Park district.

108 entrants attested to the popularity of indoor flying in this section of Chicago. Great credit is due to John Maloskie, Director of Kosciuszko Park, for his sponsorship in this contest.

Due to the large turnout of contestants, the R.O.G.'s were flown in the gymnasium

*(Continued on page 57)*

## On Frontiers of Aviation

*(Continued from page 13)*

In this country the Duramold Aircraft Corp., a subsidiary of Fairchild, has been taken over by the Clark Aircraft Corporation, at whose head is undoubtedly Mr. V. E. Clark, former chief engineer of the Fairchild concern. The Duramold Company that was working on the latest Fairchild is one of the chief exponents of the Bakelite process in this country.

The Clark Aircraft Corporation has been formed to take over the Duramold Aircraft Corporation. Thus the new low wing airplane of Bakelite that has already taken its first test flight will still be known as the Fairchild "46." The Ranger division of Fairchild has recently sold its engines to four foreign manufacturers for use in new airplanes. There is also the surprising news that there are two prominent airplane manufacturers in the United States building new military airplanes around the latest in Ranger aircraft engines.

The Vance Breese airplane which is the first airplane to be completed with a Bakelite finish is kept secretly locked up in its hangar at Van Nuys, California, when it is not out on a test flight. As we have said before it is a midwing airplane, and add that it is powered by two Jacobs engines. There is just a single rudder of good area and something on the design of the new Vought low wing scout bomber. Over the forward part of the cabin where the pilot and co-pilot sit, there are hatches which fold upward for easy exit and extrance. The landing gear retracts backwards into the engine nacelles.

The flying wing mania is here with us again. At Cleveland, Jimmie Taylor test-hopped the very latest in that category. A crack-up was the result but the plane has been repaired to undergo further testing. The construction is stainless steel. It is a mid-wing powered by a 90 hp. Menasco engine turning a pusher prop, and two people sit in the stubby little cabin. Being a tailless airplane the rudders are at the wing tips with an extra pair close in near the fuselage. Ailerons are at the tips with stabilizer and elevators at the wing trailing edge nearer the fuselage. The trailing edge of the wing is straight across, but the leading edge slants back somewhat. Wing spread is only about 35 feet. In the very blunt nose is a radiator which, by some means or other, has its effects of cooling the engine at the rear of the fuselage. Directly under the engine is the tail wheel with the two main landing gear wheels a short distance forward. The ship weighs 1,800 pounds and was designed by Mr. Tom Carroll and Mr. Tom Huff in conjunction with Tuscar Metals Inc. and the Research Aircraft Corp. of New Philadelphia, Ohio. Eugene Vidal, former head of the Bureau of Air Commerce, is associated with the development of the aircraft.

Another flying wing is one produced by Batwing Aircraft Corp., which might be mistaken for Waldo Waterman's Arrowbile. However this plane differs in that it is of the mid-wing species. Another interesting feature is that it is powered by an English 75 hp. Pobjoy engine. Wingspread is 36 feet and construction is a combination of wood and steel tubing.

The third flying wing on our list will never take the air though it will be the largest and most modern yet built. The design has been completed and construction begun. It will be exhibited at the New York World's Fair as a climax to the transportation exhibit. The purpose of building it has been to show the public what the airplane of the future may resemble. It is very much like the giant flying wings foreseen by many of our prominent aeronautical engineers. Eight large engines are located in the front of the wing with additional rocket ports for sending the monster on its way. The design has been undertaken by Mr. Raymond Loewy, industrial designer.

Benny Howard's next airplane will be twin-engined. It will be a high wing monoplane with Menasco Super-Buccaneer engines under the wing. The tail will be of the twin rudder type. Known as the DGA-10, the airplane will have a tricycle landing gear with all three wheels retractable. There will be room for seven passengers.

The Piper Aircraft Co. is designing their new airplane with side-by-side seating to carry one of the new 50 hp. engines now on the market. Menasco has received an A.T.C. for their new 50 hp. job and now find themselves with another competitor; namely, Franklin. Formerly building Franklin motor cars, the company has been reorganized and are now entering the aviation field with a small engine developing up to about 53 hp. Another company under the name of Freedman-Burnham has produced a very good looking adjustable pitch propeller for light planes such as the "Cub." It is a wooden prop with metal hub. Its chief feature is that if one blade is broken it may be replaced without purchasing an entirely new propeller.

Max Harlow's PJC-1 had the unfortunate circumstance of not being able to get out of a spin during Department of Commerce tests. The pilot was forced to jump and the plane landed in a lot by itself, escaping the complete "wash out" stage. A new ship is now under construction to replace the ill-fated one. Had they used the emergency tail parachute now used fluently for testing the airplane might have been saved. Recently this type of parachute has been used in the testing of the latest Bellanca Junior and the new Grumman midwing fighter. Grumman had some bad accidents during spin testing so now she is taking no chances. The principle is very simple. A small 'chute is attached to the tail of the airplane and if the pilot finds he cannot pull the ship out of a spin he opens the 'chute and the resulting drag stops the spin instantly.

It is rumored that American Airlines may purchase some Boeing four-engined transports. The reason for this is that delivery may be quicker than that of the Douglas DC-4.

Marion McKeen recently took his famous racer "Miss Los Angeles" on a test flight out at the Metropolitan Airport at Van Nuys, Calif. Also at Van Nuys at

# NOW READY!

# A NEW SMALL GAS MODEL
## SO SMALL IT WAS TEST FLOWN INDOORS

**DESIGNED FOR USE WITH SMALL GAS ENGINES**

**Wingspan 44" Length 32" Flying Weight with Motor 17 ozs.**

The "Eaglet" gas model was designed by Ben Shereshaw, foremost authority on small gas models in America today. The first trial flights were actually made in the Newark Armory, where the "Eaglet" proved itself the finest, most stable, small gas model in existence today. When flown outdoors the model gave a wonderful performance, which exceeded all expectations, having a climb that can be described mildly as spectacular and, added to this, a flat glide that is really sensational. The super-streamlining has been simplified to a degree where any model builder with little or no experience can build the model easily. The entire model requires only ⅓ the time to build that large gas models require.

KIT IS 100% COMPLETE including a pair of M & M Pneumatic Wheels with inflating tube; 10" semi-finished basswood propeller; all ribs, bulkheads, fairings, etc. clearly printed on sheet balsa; balsa tail wheel; spring steel landing gear wire; battery box, etc.; generous quantities of liquids; all required insignia; large full-size, detailed plans giving every bit of information needed for building and flying the "Eaglet," with photographs. The biggest gas model kit value in America today! Order your kit NOW—either from your dealer or direct from the factory. On test flights the "Eaglet" was powered and flown very successfully with the Brat and Trojan engines. These engines, as well as other small gas engines, may be purchased direct from Scientific at prices listed. Engines are complete, ready to run, including coil, condenser, propeller, oil, and instructions.

**DE LUXE KIT**

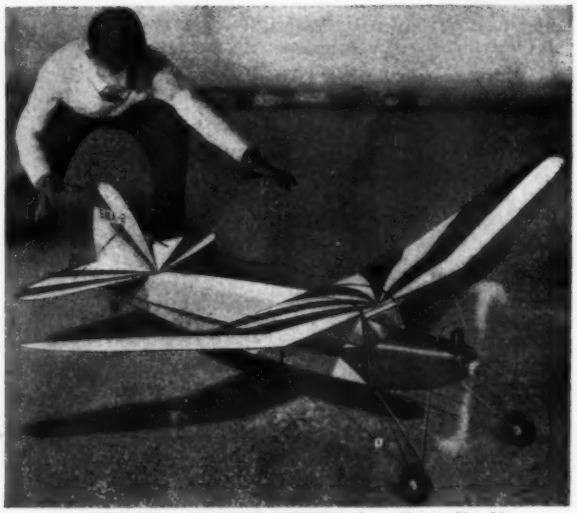
**$3.95**

**POSTPAID OR AT YOUR DEALER**

**Including M & M Pneumatic Rubber Wheels**

# NOW! THE SENSATIONAL *RED ZEPHYR* GAS MODEL AT A NEW LOW PRICE

**ONLY $4.95 POSTPAID (Less wheels)**



**6 ft. WINGSPAN; 56" LONG; WEIGHT (Less Motor) 2½ Lbs.**

**HOLDER OF PRESENT CHAMPIONSHIP OF FRANCE**

**DESIGNED IN RESPONSE TO THE DEMAND FOR A RELIABLE GAS MODEL AT A REASONABLE PRICE. THE ONLY LOW PRICED MODEL WITH ALL THESE VITAL FEATURES:**

**PRECISION BUILT!** Accurate, fully detailed, full size drawings and complete instructions guarantee you a perfect model, easily constructed.

**QUALITY FEATURES!** Simple and highly efficient aerodynamic design with low wing loading.

**PERFORMANCE!** Takes off from the ground unassisted in about 25 feet, climbs beautifully, and lands perfectly.

**ECONOMY!** The most inexpensive GOOD model to buy, so simple in construction that upkeep cost is nothing.

**SPECIAL FEATURES!** Full shock-absorbing landing gear with new type, easily attached brackets. Vibration absorbing motor mount. Reinforced nose and hook to protect motor. Wings quickly demountable for easy transportation.

**HERE'S WHAT THIS KIT CONTAINS:** Complete printed cut wood, including ribs, bulkheads, wing tips, rudder sections, etc.; all strip wood of finest quality accurately cut to size; bamboo paper; rubber; complete set of hardware including nuts, bolts, landing gear brackets, and heavy wire, battery wire, washers, etc.; large can gas model cement; streamlined tail wheel; 2 large sheets of full size plans with instructions, photographs, diagrams, and detailed illustrations—everything you need to build this wonderful gas model.

Fly the Red Zephyr with the new Model "D" Brown Jr. engine (Price $10.00) and you will have the finest combination possible. The complete combination price of $14.95 for engine and airplane is sensationally low. Order now while the supply is plentiful.

Red Zephyr, less wheels.....$4.95 postpaid
Red Zephyr, including Pneumatic wheels.....5.95 postpaid

Ask Your Dealer to Show You this Wonder Value Today!

**TROJAN JR.**
3½" High, ⅝" Bore, ⅛ H.P. Light Weight—Powerful. Postpaid **$16.50.**

**BRAT ENGINE WITH TRANSPARENT FUEL TANK AND DIE CAST CRANKCASE**
3½" High, 15/32" Bore, ½" Stroke 1/10 H.P. Postpaid **$16.50**

**OTHER SMALL ENGINES**

| | | | |
|---|---|---|---|
| Husky Jr. | $12.50 | Cyndor | $18.50 |
| Pee Wee | 14.50 | Elf | 21.50 |

**MISS AMERICA (At Right) 7 Ft. DeLuxe Gas Model**
**STILL THE NATION'S BIGGEST KIT SENSATION**
7 Ft. Wingspan. Weight (less motor) 2¾ lbs.
22 Minutes on 1 oz. 18 to 1 glide.
**THE BIG RED AND BLUE PLANE THAT HAS ALL THE WANTED FEATURES**

Kit is complete with every item required, including 3½" pneumatic rubber wheels, and finished hardwood gas model propeller. If you want a reliable flyer for general sport or contest flying, ask your dealer to show you this Miss America model. Complete Kit, **$9.50** postpaid, less motor. Miss America Kit & Brown Jr. "D" Motor only **$19.50**, postpaid.

**THE STREAMLINER (At Left)**

**Wingspan 6 ft.; Weight (Less motor) 2¼ lbs.; Length 43".** Gas model builders from coast to coast are acclaiming this new gas model. The Streamliner is really an advanced type of gas model and the kit for it is the most complete on the market today. Complete construction kit, Postpaid, or at your dealer, **$4.95** Less motor & wheels. The same complete kit as described above, but including a pair of 3½" pneumatic rubber air wheels (valie $1.50 pair) **$5.95** Less motor, POSTPAID.

## GUARANTEED SCIENTIFIC GAS MODEL SUPPLIES

**SCIENTIFIC GAS MODEL FINISHES**

Clear Nitrate Dope, Colored Nitrate Dope, Nitrate Thinner, Gas Model Cement, Regular Cement, Bamboo Paper Cement, Banana Oil.

| | |
|---|---|
| 3 oz. bottle | $ .25 |
| ½ pt. can | .50 |
| 1 pt. can | .75 |
| 1 qt. can | 1.40 |

**Special New ONLY $1.95 POSTPAID**


**BUILD YOUR OWN MOTOR**

**MIGHTY MIDGET**
Complete kit—all parts ready made, easily assembled. New one-piece cylinder and head. Includes propeller, oil, instructions, and double guarantee.
Upright engine kit **$9.85** Postpaid
Inverted engine kit **$10.10** Postpaid

**QWIN AERO**
Upright motor kit **$11.35** Postpaid
Inverted motor kit **$11.60** postpaid


EACH, 65c

**REPLACE YOUR OLD COIL NOW WITH A**


**$2.50 Postpaid**

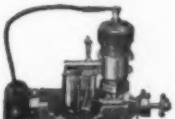
You'll be surprised at the new pep and power your engine has.


| | |
|---|---|
| 1¼", 1⅜", 1½"—pair | 50c |
| 1⅝"—pair | 60c |
| 1¾", 1⅞", 2⅛"—pair | 60c |
| 2¼", 2⅜"—pair | 60c |
| 2½"—pair | $2.75 |
| 4½"—pair | 2.75 |

**SPECIAL FOR THIS MONTH ONLY 69c**

**TRU-PITCH GAS PROPS**

13", 14", 15", 16", each, 69c



**The NEW OHLSSON**

With transparent celluloid gas tank; ⅞" bore, 15/16" stroke, 500 to 14,500 R.P.M., ½ H.P., Bare weight 6½ oz., height 4¾", 20 min. on 1 oz. fuel. Radial or side mounting. Complete with tank, coil and condenser.

Postpaid.....**$18.50**

# SCIENTIFIC MODEL AIRPLANE CO.

**218-220 M.A.-8 Market St. *"Gas Model Headquarters"* NEWARK, N. J.**

In France: E. Kruger & Co., 9 Rue St., Sebastien, Paris.
In England: H. & S. Norman, 46 Derby Rd., Kirkhams, Prestwich, Lancs.
In Australia: Swift Model Aircraft, 158 Adelaide St., Brisbane, Queensland.
In South Africa: Stratosphere Model Aircraft Supplies, P. O. Box 3248, Johannesburg.

the present time is a fleet of revamped war planes making ready for the greatest air epic ever to be filmed, "Men Without Wings." There are Fokker biplanes, de-Havillands, SE-5's, Spads, Nieuports, Travel Airs and Boeings dressed up as realistic planes of the late World War. Tex Rankin, Paul Mantz, and Frank Clark are among the most noted pilots flying these airplanes. The film is still in its preliminary stages and many airplanes are being rushed to completion in all parts of the country to take part in the "dog fights" that will be staged at a later date.

Stainless steel airplane wings, alleged to be lighter and more efficient than the present types, were tested at the E. G. Budd Manufacturing Company plant in Philadelphia last week by Army and Navy officials, members of the Bureau of Air Commerce and officials of private lines.

A wing manufactured by the Budd Company for the Army's new 300 mile an hour Seversky pursuit planes, an all duralumin ship now under construction on Long Island, underwent a series of punishing tests. Army and Navy engines worked in the utmost secrecy, over a period of four days, testing the unit for its resistance to corrosion, vibration and strain.

The new stainless steel wing weighs several pounds less than the duralumin wing it was designed to replace, is four times as rigid, will withstand a static load test somewhat greater, can hold up under seven times as much vibration, and is wholly corrosion proof, according to Enea Bossi, director of the Budd Company's aircraft division.

Representatives of commercial airlines who witnessed the tests expressed interest chiefly in the non-corrosion benefit. If this factor can be obtained without sacrificing weight, it would eventuate in a saving of ten per cent in maintenance costs, the executives pointed out.

With all the advantages stainless steel has to offer, it still will not cost more than duralumin. A recently developed method of fabricating stainless steel, which entirely eliminates the slow and costly riveting processes now in vogue, will enable manufacturers to turn out eight to ten times as many planes as before, Mr. Bossi indicated.

Further, there is no monopoly in the United States on stainless steel as there is on aluminum products, he added.

The first stainless steel airplane, a light two place amphibian, was manufactured by the Budd Company in 1931 and then flown over most of the United States and Europe. At present it is on exhibit outside the Franklin Institute in Philadelphia, having withstood perfectly corrosion for some years.

### How to Build a Model of the Bellanca Jr.

One of the odd qualities which give the Bellanca Junior such an excellent performance is the airfoil section designed by Mr. Bellanca. It is used on the plane with a negative angle of incidence and is far from the streamlined shape of the modern N.A.C.A. series. On the recent Bellanca three-engined racer Bellanca did use the N.A.C.A. 23012 wing section, but apparently Mr. Bellanca has more belief in the safety qualities of his own wing section and claims that using such his planes can climb out of fields with a smaller amount of horsepower. Bellanca aircraft have certainly been noted for their fine performance and this new Bellanca Junior is no exception. It is destined to be a very popular airplane because of its low cost. It is the intermediate step between planes of the Taylorcraft type and the Stinson type.

The material used in making the model is balsa wood which may be purchased from any of the supply companies advertising in this magazine or perhaps from your neighborhood department store or model shop. This wood is very easy to work with and no expensive tools are required for cutting. The major tool used in building a model airplane is the razor blade. Get dimensions of stock from plans and insist on good quality balsa for you want your scale model to look the best. Also purchase a tube of colorless model cement and if you wish, the wheels. If you desire to build your model other than the size shown we suggest that it be photostated to the desired size. Then you will have full size plans.

Make the fuselage first. Draw the outline of the top and cut around it with a jig-saw or shave it down with a sharp chisel. Be sure the grain of the wood runs lengthwise. Go over the surface with coarse sandpaper. Draw on the side view in correct position and cut once more. Sandpaper again and then bring your razor into use by rounding out the cowling and cleaning the fuselage up in general as shown by the cross-sections. Go over the finished fuselage first with coarse sandpaper and then fine sandpaper.

The two wing panels are made in much the same manner. Draw the outline of the top view and cut. Then taper them down as shown in front view and by cross-sections. The wing fillets, joints where the wing fairs into the fuselage, will be molded with putty later.

The tail units are easily made from sheet balsa but take enough time on these to be accurate. Make the struts for the landing gear and then begin work on the propeller. The easiest way to make the prop is to shape out a spinner and then cement two blades to it with the correct angle of pitch.

Begin the assembly of the model next. Lay the fuselage on a flat surface in flying position and join the wing panels with plenty of model cement. Lay blocks under the wing tips to hold the correct dihedral. Then join the tail surfaces. When all joints have dried thoroughly raise the model and build on the landing gear. Small wire dowls through struts and into wing will strengthen the construction. Use a straight pin as axle with the axle joint reinforced with thread and plenty of cement. Pin the propeller to the nose and join the tail skid which may be made from scrap wood. Make smooth surfaced fillets with putty and then put on the wire bracing at the tail. Black thread may be better to use in place of the wire. Go over all joints once more

## *By Popular Demand • A New Gas Type Rubber Powered Model Airplane*

**Wingspan 36" Length 28" Weight 4 ozs.**

### FLIES 1 MILE (5280 FEET)

Hundreds of requests have been pouring in for another gas type model similar to the "Flea," which has received world-wide acclaim. The "Firefly" is our answer to these demands. If you have built the "Flea" model you will surely want this model. Its advance clean design and beauty will startle you and when you take it out to the flying field we suggest you bring a car along because you may have to chase it into the next county. Think of it—your own gas type model that will soar majestically aloft, steady and graceful as an airliner under expert command! A plane that looks and sounds exactly like a gas model in the air! You will surely want to build one of these fine models. The "Firefly" is the next best thing to a genuine gas model. It is just the model for those desiring to gain experience before tackling a real gas model.

**KIT CONTAINS EVERYTHING** required to build this model 100% complete. Wood cylinder and spark plug; M & M pneumatic wheels with inflating tube; true-pitch balsa propeller; all ribs, bulkheads, fairings, etc. clearly printed on balsa; cement; banana oil, and a vial of rubber lubricant; brown contest rubber; motor hooks and all necessary metal for building the ratchet motor-hum effect; also a set of the most complete and easily understood plans ever devised. The biggest money's worth you ever saw for only $1.95!! Order your kit NOW.

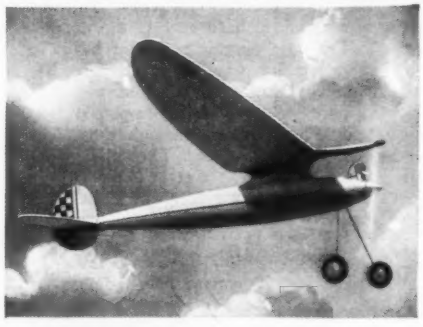
Complete Kit

**$1.95**

POSTPAID or at your dealer

Including M & M Pneumatic rubber Wheels

## NO EXPENSIVE GAS ENGINES NEEDED FOR THESE MODELS—A DUMMY ENGINE IS SUPPLIED WITH EACH KIT



### VALKYRIE

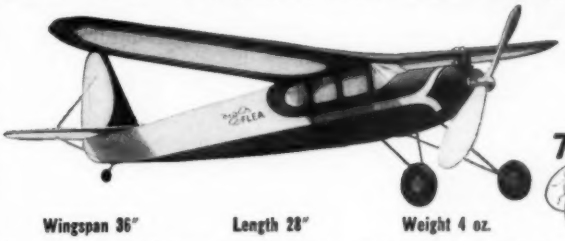
GAS TYPE RUBBER POWERED MODEL

Wingspan 24"
Length 15"
Weight 1¼ oz.
Flies ½ mile

The "Valkyrie" incorporates all the attractive and outstanding features of its gas model original; can be easily constructed in 4 or 5 hours. Sturdily built with continuous one-piece wing root built into fuselage and securely attached to underside of wing. Dummy motor looks like the real thing and is easily built. Beautifully colored and a real super-streamlined flyer. Complete kit, with full size plans and instructions **$1.00**

POSTPAID OR AT YOUR DEALER.....

## ALL THE THRILLS OF GAS MODEL FLIGHT!



THEY LOOK, FLY, AND SOUND LIKE REAL GAS MODELS

The FLEA

Wingspan 36" Length 28" Weight 4 oz.

We have spent much time on experimental work to produce a brilliant performing model airplane for you model builders who have always wanted a gas model but who have been handicapped by the expense involved. Here it is! Now you can make a gas-type rubber-powered model that will give you all the thrills of building and flying a real gas model at a fraction of the cost.

**KIT CONTAINS EVERYTHING** required to build the model 100% complete: Pair of 1⅝" M & M pneumatic wheels with inflating tube; true-pitch 10" balsa wood propeller; ribs, bulkheads, etc., clearly printed on balsa; cement; clear dope; rubber lubricant, etc.; brown contest rubber; all necessary metal for building ratchet motor-hum effect; also a set of easily understood plans including all information on building and flying the "Flea" model.

It looks like a gas model—it flies like a gas model—it sounds like a gas model—and it costs only.....

**$1.95**

Postpaid or at your dealer, including M & M Pneumatic rubber wheels

## SCIENTIFIC MODEL AIRPLANE COMPANY

218-220 MA-6 Market Street *"GAS MODEL HEADQUARTERS"* Newark, N. J.

In France: E. Kruger & Co., 9 Rue St., Sebastien, Paris
In England: Model Supply Stores, 4 Stewart St., Deansgate, Manchester
In Australia: Swift Model Aircraft, 158 Adelaide St., Brisbane, Queensland
In Finland: O/Y Wiklund A/B, Turku, Abo

with cement and then sandpaper the entire model to smoothness.

The paint job is optional. Dope or lacquer make the best finishes and many coats will have to be applied before a smooth finish is obtained. When the model is completed send us a photo of it.

## Building the "Tsetse Fly"

### Construction

*(Continued from page 17)*

should then be built right over the drawing. All sizes and grades of stock are listed on the wing drawing on plate 2. Care should be taken in the shaping of the leading and trailing edges. It is suggested that some of the new ready cut "V" trailing edge stock be used as this will save considerable time. Note that each wing half is to be built in one straight piece. After the wing halves are dry, they should be removed from the board, and the tip dihedral put in each wing, as shown in the front view of the wing. Set this aside to dry. When dry cement the two wing halves together at the center, applying the right amount of total dihedral.

After this is dry, cut out the wing center spars, as shown on the left bottom of plate 2, and cement them in place. When the cement of the wing structure has hardened, cut out the cap-strips. The best way is to take a whole sheet of 1/32" x 2" medium sheet balsa, cutting it down to the approximate length of the wing half, excluding the tip. Pin the balsa in place in the notch at the root rib provided for that purpose, and pin it in place on R-10. Now with a pencil make a small mark where the edge of the sheet touches each rib.

This done, remove the balsa and cut down each rib between R-1 and R-10 to accommodate the cap-strip. That is, cut each of these ribs just like the end ribs, around the nose. This is best done by using a razor. Make sure that the little strips cut out of the nose end of each rib is no thicker than 1/32". When this is done the ends of the cap-strip should be cut so as to fit R-1 and R-10 perfectly. Note here that only half of a wing is worked on at a time, and only one surface, either top or bottom. The balsa is now glued in place, being fitted carefully into the notch in each rib. Use as many pins as necessary to hold it in place while drying. During this time work on the other half of the wing. When the second half is drying, the first half is probably dry, so remove the pins, and trim off all the extra balsa along the leading edge. Now the tip cap-strip may be glued in place. While this is drying remove the pins from and trim down the other half of the wing. The tip cap-strip is now glued on. The two tips, on top and bottom, are trimmed down as soon as dry. When all the cap-stripping is finished, it is sanded down perfectly smooth all around. The center piece may be glued in place on top. The wing will now be a thing of beauty and precision if all the workmanship has been scrupulously executed.

### *Tail*

The tail is constructed just like the wing, except that the elevator is made in one piece. Only the rudder top is shown on the plan. The sub-rudder is made later. Since the plans are self-explanatory, no further description is necessary. Don't forget to put only a cap-strip on top of the elevator. Gluing the rudder on top of the elevator should be done very carefully. Make frequent reference to the perspective view on plate 2 if in doubt. Try to keep the tail construction as light as possible.

### *Fuselage*

The first step in making the fuselage is to glue the blanks for the bulkheads. Plate 3 shows just how this is done. Make the front bulkhead blanks of heavy balsa. The length and width of the blanks may be obtained from the dimensions of the top and side views of the body. When all the blanks are dry, the bulkhead outlines are carefully transferred to the corresponding blanks, in the same manner as the ribs. The two balsa keels are cut out of ⅛" hard sheet balsa. They must be accurately scaled up making use of the secondary dimensions from the centerline. Mark off the positions of the bulkheads on each one. To start the monocoque construction, place two pins about 12" back from the nose end of the bottom keel, one on each side. That is, the keel is placed upright on the workbench, and at that point the two pins are stuck into the table so as to hold it upright. Place a block under the front end till it is 3" above the surface of the table. Now the tail end should be 4¾" above the table. Glue the front bulkhead in place on the keel and true it up with a triangle.

Now glue bulkhead B in place, true this up; now bulkhead C, and so on. Soon all the bulkheads will be in place on the bottom keel. Do this very carefully. Now the top keel should be glued in place. Note that the tail hook should be cemented in place on bulkhead M before it is set on the keel. Now the rest of the ⅛" square medium stringers are glued in place. The tail block is cut and glued in place, also the sub-rudder. This is cut from medium balsa and is reinforced around the edge by a bamboo or reed strip (see perspectives). It is a good idea to add a hard spar in the middle.

The nose plug is cut from heavy balsa. The landing gear is made according to plate 3. Note in detail X how two pieces of hard ⅛" x ¼" strip are placed together, and a hole drilled through the middle to hold the main strut. Then the pieces are taken apart, and the strut is placed between them. After this they are glued together, bound well with thread and glued in place in bulkhead D as shown. It might be wise to reinforce this joint with a few diagonal strips of ⅛" square hard between C, D, and E around the joint. The rear strut detail is shown in Y. This should be glued well and bound with thread. The wheels should be of very heavy balsa, even a 3/64" hardwood ply center would be all right.

The body is covered with 1/32"-plus sheet balsa, run along the body in strips, as shown in the plate 1 assembly view. This must be done with a great deal of precision. When the whole body is dry apply three or four coatings of banana oil with intermediate sandings with fine sandpaper.

# TRIUMPH! NEW 38 MODEL MOTOR

CLIMAXING months of intensive experimental work, and in response to an ever-increasing demand for BUNCH motors, BUNCH engineers announce they have packed still more power into the distinctly new Model "38" Gwin Aero, Mighty Midget and Mighty Marine engines. With more engineering features than any other motor the Model "38" engines are not "revised downward" and cheapened to promote sales. The new Model "38" engines are 100% "first quality" engines, offered at a price made possible only by more efficient, highly-developed production methods.

*Why Buy an Engine of 1910 Design When, for Less Money, You Can Own an Engine with These Latest Aircraft Features?*

## SPECIFICATIONS

The world's outstanding line-up of model engines include upright and inverted Gwin Aero and Mighty Midget aircraft engines. Also the Mighty Marine, the original air-cooled Marine engine for model boats, supplied complete with flywheel.

All Bunch Engines full 1/5 h.p. 5200 R.P.M.; ¼ h.p. 8500 R.P.M. Bore ⅞", Stroke ¹⁄₁₆", Bare Weight 6½ oz. Complete ready to run with coil, condenser and Champion spark plug.

Mighty Midget (Upright).....$9.50 Gwin Aero (Upright).....$12.00
Mighty Midget (Inverted).....$9.75 Gwin Aero (Inverted).....$12.50
MIGHTY MARINE.....$12.50

*Immediate factory delivery*

**$9.50 ASSEMBLED AND BLOCK TESTED**

*Check these Exclusive*

## FEATURES

MICRO-METAL MACHINE CAST CRANKCASE: A superior machine casting process, using a new "Micro-metal" aircraft alloy, makes possible, for the first time in model engine development, flawless aircraft parts.

ONE-PIECE MODERN AIRCRAFT CYLINDER: In contrast to less progressive designs, the Model "38" motors have a full-finned cylinder with a full-finned head gracefully faired and shaped to the proportions found in famous full-size aircraft engines. Bunch cylinders have always been electroplated to a bright corrosion-proof aluminum finish. Head, intake, exhaust and by-pass parts fabricated integral with cylinder itself. All sources of trouble and leaks found in the cylinder construction of various other motors are absent in the Model "38" engines.

PRESSURE LUBRICATION THROUGH HOLLOW DRILLED CRANKSHAFT: Getting at the source of greatest engine friction pressure lubrication through a hollow drilled shaft adds several hundred R.P.M. to the top motor speed of the Model "38" engines. The only model engine on the market with a crankshaft drilled expressly to provide a flowing film of oil at the main bearing. Pressure lubrication through the crankshaft is indispensable in powerful modern aircraft and racing engines. For the first time, a model engine incorporates this feature.

NEW REVERSIBLE "MARCEL LOCKING" TIMER SYSTEM: A most efficient timer system of unique design is introduced on these new engines. A marcel spring insert positively locks timer in any position from full advance to full retard.

MICROMETER TYPE, SPRING-LOCKED NEEDLE VALVE: Recognized as the most accurate and positive way to control the amount of fuel entering the intake tube, the screw-down "jitter-proof" micrometer type needle valve is used on all Bunch engines. As an added precaution a bronze spring locks the needle setting against all possible movement from vibration such as is found in the inferior, impractical "push-pull" systems.

"SQUARE SECTION" PISTON RINGS AND HI-DOME PISTON: Bunch engines are the only small engines using the newly developed "square section" piston rings, the same type used on the super 1,000 h.p. Twin Row radial aircraft engines.

*Write for FREE folder, or see these engines at your dealer's NOW!*

**BUNCH MODEL AIRPLANE COMPANY**

5013 SOUTH HOOVER STREET, LOS ANGELES, CALIFORNIA, U. S. A.

British Agents: Model Supply Stores, Sales Depot and Showroom, 4 Stewart St., Deansgate, Manchester, 3.

*Miscellaneous*

The wing mount, propeller, tail door and bearing details are all shown on the plans, thus no extra words are necessary here. The propeller should be covered with silk which is applied with cement. When this is dry apply three coats of banana oil.

For power use 26 to 30 strands of ⅛" flat brown rubber. Lubricate this well and allow plenty of slack.

All wood parts of the model should have a high gloss finish.

The original model had red wings and tail and blue decorations on the wood parts. Apply all tissue with banana oil.

To make the wing saddle, glue two pieces of 1/32" medium hard balsa, 3" x 4½", one on top of the other, and hold in place on top of the body at the position where the wing attaches. Use rubber bands. This will dry with the right curvature. The elliptical shape is now cut out and glued well to the bottom of the wing mount. See plate 3 for rest of details.

When the tail is glued to the top of the tail block it should have an incidence of plus one-half degree. The wing is held down with ⅛" flat rubber loops. Measuring from the thrust line, the incidence of the wing should be three degrees and the stabilizer one degree positive. The wing should be set at the same point as on the drawing (plate 3). In the construction of this model the tail end should be made as light as possible, and the front end of heavy balsa, to bring the center of gravity to the same point as on the drawing.

The writer would be glad to hear from anyone who builds this model and what results are obtained. Inquiries are welcome, but they should be accompanied by a self-addressed, stamped envelope. Address the writer, c/o MODEL AIRPLANE NEWS.

## Have You Tried Microfilm?

*(Continued from page 15)*

Don't try to use a sink, because it hasn't enough water area to permit the solution to spread properly. The best thing is to make a "mike" tank of galvanized iron, 30" square by about 1½" high. Or you can make a good substitute similar to the one shown in the pictures, which is made of four boards nailed together to form the sides, with oilcloth draped over this frame.

The pictures shown here are the first series ever published showing the various steps in making and using film. As an experiment they were given to a group of beginners in one of the Chicago park classes. These students were furnished with a can of microfilm, a mike tank, candle, hoop, and were told to go ahead. After studying the pictures carefully and reading the directions on the can of film, every one of these young fellows successfully made and applied sheets of microfilm without further assistance.

If you have to use your bathtub as the "mike" tank, wash it to remove all soapy remainder that may be present, and then fill to a depth of four to six inches with clear, cold water. A low temperature of the water slows up the film's drying, and permits the solution to spread evenly. Next, fill the cap of the can (or a teaspoon, whichever the directions specify), to the brim with the solution. Fill it so full that one or two more drops would cause it to overflow. Now lower the cap to within ⅛" of the surface of the water. The object is to flow the liquid smoothly and evenly onto the surface, and then prevent after-dripping. This is done by slowly (about two seconds) turning the cap to a vertical position, holding it there for one second, and then whipping it away, catching the drops on your fingers. The solution will spread until it approaches the sides of the bathtub. It will begin to dry, and after a minute or two it will start to assume color. This color will slowly change to other colors. When you can blow on the film without causing it to change color, it will be completely dry. Now proceed to take it off the water according to the following method:

Bend a wire clothes-hanger to an elliptical shape. If no such hanger is available, make your hoop out of soft iron or aluminum wire ⅛" in diameter; or else simply glue and nail four ¾" square sticks together to form a rectangle about 8" by 12". Do not use a large hoop or frame until you have gained considerable experience, as it is difficult to avoid breaking the sheet when lifting a large surface. Set your hoop on top of the film, and press it down into the water about ¼". Now hold the hoop steady in this position, while with your free hand you gather the surplus of the film to the edges of the hoop, folding it over the wood or wire. Use one side of the hoop as a sort of pivot to remain in the surface of the water, as you gradually lift the other side out. When the hoop is tilted at about 45 degrees, lift the whole thing clear; hang up to permit the water remaining on the sheet to evaporate.

For the sake of practice, it is best to cover small frames first, such as stabilizers, rudders, or Baby R.O.G. wings. Let's take an R.O.G. wing, for example. Using a fine brush, paint the outline of the wing thoroughly with water, and set it upside-down on the propped-up hoop of microfilm. Paint it further with water and press onto the film until it is stuck all around. Turn the hoop over, and set it on the table so that the wing is right side up. Heat a wire (a straightened paper clip will do, although a thicker wire will hold the heat longer) in a candle flame or gas jet to red heat, and "cut" the frame loose from the sheet by going around the outside of the wing at a distance of about ⅛". Allow the wing to dry out thoroughly on a flat surface. Then crack it in the center, and cement to the proper dihedral. To draw up the wrinkles in the center, simply paint them with water. Any wrinkles that remain can be removed by holding the wing in a column of warm air, at a cautious height above a candle or gas flame. Since the mike is highly inflammable, be careful that you don't come close, else all your work will be gone in an instant.

Another way to cover frames is in quite common use. The frame to be covered is set on a table or other flat working surface such as plate glass (which is tops), and thoroughly painted with water. Also be sure to wet the table or plate glass for an inch or so around the outside of the

# *FLASH!* HEATHE BRINGS OUT SENSATIONAL NEW GAS-POWERED MISS EMPIRE STATE

**WINGSPAN—7 feet 9 inches**
**WEIGHT—3¾ lbs. complete with motor and gas**

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**MASTER SET**
**$6.95** plus 50c postage — complete without motor, with all parts as specified.

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**$11.95** plus 75c postage — complete without motor, with all parts plus: Carved prop, cut-out ribs, two ½ pts. of colored dope. 4 yds silk tips & jacks, 3½" Air Wheels, Landing gear brackets, Gas filter funnel, Turned Aluminum Prop Spinner.

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**LUMBER GAS MODELS—ALL FIVE FOOT LENGTHS**
The following wood can be had in Spruce, Bass, or Balsa at the Same Prices as those listed below.

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| ⅛x⅛ | $ .02 |
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| ¼x¼ | .07 |
| ¼x½ | .07 |
| 3/16x3/16 | .04 |
| 3/16x⅜ | .05 |
| 3/16x½ | .07 |
| 3/16x1 | .08 |
| ¼x¼ | .05 |
| ¼x½ | .06 |
| ¼x1 | .10 |
| ⅜x⅜ | .09 |
| ½x½ | .10 |
| ½x1 | .18 |
| 1x1 | .25 |

**REED**
⅛" 3 ft. for .05
3/16, 3 ft. for .07
¼", 3 ft. for .10

**BIRCH DOWELS 36" Lengths**
3/16 dia. .. .04
¼ dia. .. .05

**SPUN ALUMINUM WHEELS**
5" dia. per pair only....$1.50

**SHEET BALSA (Special for Gas Models) ALL 36" Lengths**

| | |
|---|---|
| 1/16x2 | .04 |
| 1/16x3 | .06 |
| 3/32x2 | .05 |
| 3/32x3 | .09 |
| ⅛x2 | .05 |
| ⅛x3 | .09 |
| 3/16x2 | .07 |
| 3/16x3 | .11 |
| ¼x2 | .09 |
| ¼x3 | .13 |
| ½x2 | .18 |
| ½x3 | .30 |

**For Five Foot Lengths in Sheet Balsa, Double Three Foot Length price.**

**GAS MODEL WHEELS**
Special pneumatic wheels good for gas model from 3" to 8". Size 3½". Price pair .....$1.50

**Carved Props for any Motor, each only .....$1.00**

**BAMBOO PAPER**
24"x36" sheet .05

**SHAPED PROPELLER BLANKS**
Specify size of prop & Motor, each only.....25c

**TOGGLE (ON-OFF) SWITCHES. 45c**

**MINIATURE KNIFE SWITCHES**
2 poles..25c each
3 poles..35c each

**SPRING STEEL WIRE (In 5-foot lengths)**
1/16 dia. 5' .05
3/32 dia. 5' .15
⅛ dia. 5'.. .25

**CEMENT & DOPES**
These liquids are specially made for gas powered models and should not be confused with those used for rubber powered models.

| | |
|---|---|
| 4 oz. | .18 |
| 1 pt. | .60 |
| 1 qt. | 1.00 |

**Gas Model dope and paper adhesive, same price as cement.**

**DURAL ANGLE BEAM**
⅛"x1½" foot .20
¾"x¾" foot .30

**SHEET CELLULOID**
12x16 sheet .18

**COLORED DOPE All Colors**

| | |
|---|---|
| 4 oz. | .20 |
| 1 pt. | .65 |

**MODEL MAKERS KNIFE**
each ..... .10

**SHEET ALUMINUM**
1/32", 6"x6" .15
1/16", 6"x6" .25

**SPECIAL JAP SILK**
Grade A silk per yd. ..... .40

**MODEL MAKING PINS**
per 100..... .05
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Each ..... $1.00

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(Like Auto-Knips 1¼ oz. wt.)
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For gas Model Props. Each..$.30

**GAS MOTOR COWLS**
6½" ea.....$ .90
8" ea.....$1.25

**FILTER FUNNEL**
A Special Approved Funnel to fit your tank.
Each ..... $ .35

**NUTS & BOLTS**
3/16" 1", 1¼" Long.
Per doz.....$ .15

**WOOD SCREWS**
½" ¾", 1"
Per doz.....$ .05

**ALUMINUM RIVETS (Lightweight)**
1/16 x ¼ per doz. .....$ .05
3/32 x 3/16 per doz. .....$ .05
⅛ x ¼ per doz. .....$ .05

**AXLES**
Any length up to 30" 3/32" dia. or ⅛" dia.
Each .....$ .35

**DURAL WIRE**
3/32 dia. 3 ft. .....$ .10
⅛ dia. 3 ft. .20

**BRASS TUBING (Supplied in all Lengths)**
1/16 dia. 1 ft. .....$ .15
3/32 dia. 1 ft. .....$ .15
⅛ dia. 1 ft. .....$ .15
3/16 dia. 1 ft. .....$ .20
¼ dia. 1 ft. .....$ .20
5/16 dia. 1 ft. .....$ .20

## BEST VALUES IN RUBBER POWERED SUPPLIES

**18" BALSA**
1/16x1/16 .....100, 5c
1/16x⅛ 35 .....for 5c
1/16x3/16 .....18, 5c
1/16x¼ 15 .....for 5c
1/16x⅜ 5 for 5c
3/32x3/32 .....30, 5c
⅛x⅛ 30 for 5c
⅛x3/16 12 .....for 5c
¼x¼ 10 for 5c
3/16x3/16 .....8, 5c
¼x¼ 6 for 5c
¼x⅜ 3 for 5c
¼x½ 2 for 5c

**BALSA SHEETS**
1/64x2 6 for 10c
1/32x2 8 for 10c
1/16x2 8 for 10c
3/32x2 7 for 10c
⅛x2 6 for 10c
3/16x2 3 for 9c
¼x2 3 for 10c
3" sheets or 36" lengths, double above prices: add 10c package charge for 36" lengths.

**18" PLANKS**
1x1 5c; 1½x2 6c
1x1½ 9c; 1x2 10c
1x3 15c; 2x2 18c
2x3 23c; 2x6 39c
3x3 40c; 3x6 75c

**PROPELLER BLOCKS**
⅛x ⅜x 3 5—5c
½x ¾x 6 6—5c
⅝x1 x 7 4—5c
⅝x1 x 8 3—5c
¾x1¼x10 2—5c
¾x1¼x12 3c ea.
1x1½x12 4c ea.
1x1½x15 6c ea.

**MACHINE-CUT BALSA PROPS**
3" 4c; 6" 5c;
7" 6c; 8" 7c;
10" 8c; 12" 10c
15".....15c

**NOSE BLOCKS**
1x2x1 .....1c
2x2x1 .....2c
2x2½x1 .....3c
3x3x1 .....5c
3x3x2 .....8c
3x3x3 .....10c

**INSIGNIA**
24 and stripes 5c

**WASHERS**
1 dz. ¼ or ¼ 1c

**THRUST BEARINGS**
Small ....doz. 10c
Large ....doz. 15c

**DOWELS**
1/16x6" ..doz. 5c
⅛x18 ....2 for 3c
3/16x¼ 3 for 5c

**RUBBER**
.045 ....25 ft. 5c
1/16 sq.. 20 ft. 5c
¼ flat..18 ft. 5c
Skein .....40c

**BAMBOO**
1/16 sq.x12, 36. .....10c
1/16x¼x15, ds. 10c

**WIRE**
6-8-10-12-14 .....6 ft. 3c

**WOOD VENEER PAPER**
20x30..1 for 10c

**BAMBOO PAPER**
5c per sheet

**CELLULOID**
6x8 .....3c
12½x16 .....18c

**WING AND TAIL LIGHTS**
12" 10c; 15" 15c; 24" 20c.

**CAMEL'S HAIR BRUSHES**
Small 3c; Lge. 5c
Extra large.....8c

**CLEAR DOPE OR BANANA OIL**
1 oz. 5c 2 oz. 7c
4 oz. 13c 1 pt. 45c

Thinner same price as clear dope

**NOSE PLUGS**
½" .....doz. 8c

**COLORED DOPE**
White, yellow, orange, blue, red, green, olive drab, black, silver, gold.
1 oz. .06 2 oz. .10
4 oz. .19 1 pt. .65

**COLORLESS CEMENT**
1 oz. .05 2 oz. .08
4 oz. .15 1 pt. .50

**TISSUE, AA**
All col., doz. 10c
Silver .....ea. 5c
Superfine, wh. 5c

**SANDPAPER**
5 sheets.....5c

**MOD. STANDS**
Small .....15c

**WHEELS per pr.**
**Brch Bisa Cellu**
½ .01 .03
¾ .02 .04 .05
1 .03 .05 .07
1½ .04 .08 .10
1⅞ .07 .10 .16
3 .20 .15 .30

**SHT. ALUMINUM**
.0003x3½ ft. 1c
.005 in. 6x6 5c
.010 in. 6x6 6c

**DUMMY RAD. ENGINE (Cellu.)**
1½" d. 10c; 2" d. 20c; 3" d. 25c.

**ENGINE AND COWL (Cellu.)**
1½" dia. .....15c
2" dia. .....20c
3" dia. .....25c

**CELLULOID PANTS, per pair**
½" to 1" .....18c
1⅛" to 1⅞" 33c

**METAL PROPELLERS**
2 blades 3 blades
1½" 5c.....08
1¾" 10c.....10
3½" 15c.....20
4½" 20c.....25

**ALUM. TUBING**
1/16, 3/32, ⅛ ft. ..... 7c
3/16 or ¼ ft 10c

**ALUM. COWLINGS**
1¼" 15c 2" 18c
3" 25c 2½" 32c
Specify whether anti-drag or closed

**BOMBS**
¾" 4c; 1¼" 7c
3" 13c

**GUNS WITH RING MOUNT**
1¼" 10c
1¾" 15c

**PURSUIT MACH. GUNS**
¾", 1¼" or 1¾" each 3c

**BUSHINGS**
1/16 .... 4 for 1c

**WOND. WATER SPRAYER 20c**

**MODEL PINS**
½" or 1" pkg. 5c

**PROP. SHAFTS, REAR HOOKS**
doz. .....8c

## HOW TO ORDER

Add 15c to orders under $1.50. Orders over $1.50 add 10% of order. For 36" lengths add 10c extra. Add 20c to all orders that contain balsa or wire in 5-foot lengths to cover special handling. All 5 ft. Canadian orders shipped express collect. All orders shipped same day received!

# HEATHE MODEL AIRPLANE COMPANY

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frame, as this will aid in holding the film down in place. Place the hoop of film down over the frame, so that the hoop completely surrounds it. Blow on the film to make it stick to the wet frame, and to the table or glass outside of the frame. When completely stuck, cut the frame loose from the sheet, as before, with the hot wire.

For best usage, microfilm should be red or green, or a combination of these colors. It is important, but not always easy, to obtain the right colors. The thickness of the film determines the color or lack of it. If the film is quite thick and heavy, it will be colorless and can be handled like fine tissue paper. On the other hand, if it is too thin and light it will be colorless also, but cannot be handled in any manner. In between these two extremes, starting from the thick end of the range, the shades will vary about like this: dull green, dull pink, bright emerald green, bright pink, brilliant yellowish green, yellow, gun-blue, gold, silver. The thinner the sheet, the more brilliant the colors. If you have trouble with sheets breaking, the chances are that they are too thin. The cause of this, of course, is that you are not getting enough solution onto the water, or that the amount of water surface is too great in proportion, which is saying the same thing. A small addition to the amount of solution in the cap or teaspoon (by taking the cork out of the cap, or using a larger spoon) usually makes the sheets strong enough to prevent breakage. Or else you may reduce the amount of water in the tub. If you are using a mike tank, place a spreader stick on the surface of the water, near one side. Make this spreader a bit longer than the side of the tank, so that the tank will hold it in position. The stick will reduce the amount of water area on which the mike can spread, and you can thus vary the thickness of the sheets to suit yourself. This method is known as forcing, and should be used when your sheets are gold, gun-blue or thereabouts, and break too easily.

Contrary to what you may think, thin sheets have a greater warping tendency on light structures than the heavier sheets.

Patching is the next step in your mastery of microfilm. It can be done in two ways. One of these is shown in some of the pictures. Cover a small wooden frame, equipped with a handle, with film, and then apply over the hole in the covered wing. Wet the frame thoroughly, and using the handle, carefully work the patch-frame loose. The patch of film will remain on the wing. Another way is the one invented by Howard Negri, up-and-coming member of the Chicago Aeronuts. Negri places a folded sheet of paper on a sheet of film, and puts a drop of water at the four corners of the paper. This causes the film to stick to the paper, and he then cuts it loose from the hoop with the hot wire. The other half of the paper is now folded around, so that the film is between the two layers of paper. He then folds it some more, or rolls it, and sticks it in his pocket to carry to the contest. To patch, he cuts the paper (with the mike still between the two layers), using a pair of scissors, to a little over the size of the hole; then unfolds the paper and lays the half to which the film is sticking on the wing. The paper is carefully removed, and the patch is finished. The real advantages of this system are the ease with which film may be taken to contests, and the convenience

of cutting it to the desired size for the hole being patched.

When covering fuselages, you may add a few drops of castor oil to your can of microfilm in order to obtain greater flexibility in the sheet of mike. This permits it to stretch around the curved portions of the body. This method has obvious limitations, as the film becomes sticky from the castor oil and tears easily. A better method is the one developed by Milton Huguelet, also of the Chicago Aeronuts. The hoop of film is first propped up, and the body moistened and placed on the sheet. It will stick to the film about the rear half of the body, which is then trimmed as far as it is stuck, except for the extreme rear which is not to be cut loose yet. The body will sag down in the sheet, now, so that more is stuck, and can be trimmed. Keeping up this process, the entire side is soon covered, and the front and rear may be cut loose from the sheet. The advantage here is that one may use the same non-sticky microfilm that is used for the wings, etc.

## How to Build a Gas Powered Camera Model

*(Continued from page 26)*

lizer may be slipped in position. Be very sure that it is at right angles with the fin. Then cement it in place securely. Now, slide the hardwood dowel pins through the fin ribs and also place them in the aluminum tubing in the fin base which was installed earlier. Be certain that the stabilizer meets the surface of fin rib No. 8, equally, and also that it lines up with the wing (slide wing panels in center section to check this). To complete this operation, cement the pins securely and do not withdraw the empennage unit until dry. Between fin stub ribs Nos. 8 and 9, at the forward dowel pin, prepare another safety-pin hole, as was done for the wing panels in the center section of the wing. Mix some more paste of corn starch, clear lacquer, and aluminum powder and apply it in the corners between the fin and stabilizer, as you did in streamlining the fin stub and fuselage.

### Covering and Finishing

Bamboo paper is used for covering, although silk is permissible, of course. In using bamboo paper, the job is much simplified. Incidentally, don't forget to attach a length of fine, strong thread on the flight timer arm extension for the camera shutter, dropping it through the hole provided in the cabin roof and through the pulley, before covering. Use only as large a section of paper at a time as is practical, to insure a smooth job.

In covering the fuselage sides and top from the cabin back, use clear dope for sticking on the corners only (top and bottom) of the fuselage. Stretch the panel of covering tightly over the side stringers, so that only they are seen when surface is doped and shrunk. Cover the nose of the ship with small sections also. Proceed with the landing gear, wing, and tail surfaces. When completed, first water-shrink the covering, following with two coats of clear, full strength nitrate dope.

The writer's model was originally painted in bright red throughout, but after 5 months of continuous flying the color scheme was changed to all-white, with purple trim, and finished with a gold pin stripe between the two. Such a combination is very attractive and something "different." However, the color remains a matter of personal preference. In painting, all parts such as the cabin windows, timer arm, wheel axles, tail skid, and dowel pins must be masked off, using scotch tape (cellophane). Spray the paint job to obtain the finest finish. At least two coats of pigmented dope should be applied. Install the engine and secure the 3½" air wheels on the axles by soldering washers on the ends.

To adjust the camera for operation, first secure it in its position on the mounting. Put a rubber band in the length of thread (coming down from the timer) between the pulley on the bulkhead and the shutter extension. On the end of the thread install a hook made from a pin. It is possible to make pictures any length of time after the take-off up to 50 seconds (about capacity of Autoknips timer) by merely inserting a series of "S" hooks in the line between the hook which was just put on and the shutter extension. In other words, the procedure of operation is to first wind up the flight timer, relieving the tension on the thread. The camera shutter is then snapped backward (holding the finger over aperture when loaded with film). As the timer brake is released and timer spring begins to wind down, the arm in the timer case which travels inward begins to pull on the shutter thread, over the pulley. Say for example it is done, and the camera shutter is found to snap forward in 20 seconds, and a longer period is desired. Merely add an "S" hook or two in the line at the shutter to raise the time. This decreases the tension of the shutter control thread slightly. Obviously, the camera is only able to take one exposure on each flight, but the film can be quickly rolled to the next exposure between hops.

### Flying

First, check it for balance. If it balances with the nose slightly down, holding the wing on the fingers a third of the way back from the leading edge, with all surfaces in neutral position, it should be set for a flat glide. Hand gliding is not recommended but can be done if launcher is running fast enough to give it flying speed. Do not adjust the fin tab until the reaction on the glide has been observed. Torque does not bother the plane to any great extent due to the long moment arm. It should be adjusted for powered flight to the left and gliding to the right, in rather large circles. For test flights, set the flight timer for only about 25 seconds, and let it go with the engine about half throttle. The performance can be increased gradually by giving the motor more "supe" as the flight characteristics of the gas job are made evident.

The writer would be particularly interested in knowing of the results of flights with the model and also any good aerial photographs which are obtained by others. Anyone wishing further help on any specific part or parts of the construction may contact its builder, in care of MODEL AIRPLANE NEWS, and assistance will be gladly given.

## The Army Takes to the Stratosphere

*(Continued from page 5)*

used only should the ventilating system fail.

In addition to the experiments in actual flying in the sub-stratosphere, other tests are carried out at Wright Field on the ground. There is a large air pressure chamber in one of the engineering laboratories, in which temperatures and atmospheric conditions similar to those encountered in the sub-stratosphere are produced and studied by expert engineers.

This air chamber is divided into three compartments, two of which can have different air pressures at the same time. The third or central compartment is used as an entrance, and separates the two compartments. A telephone connection enables the men inside to communicate with those on the outside in reference to the operations. The exact effects that arise in individuals when they are flyng above the earth in the sub-stratosphere occur in this pressure chamber. This enables the army to better prepare its men for actual flight in the strato-plane, for it determines the individual reaction of those who are to make the flight without even getting them off the ground.

There is also a small "pressure chamber" in which tests not unlike those given to humans are tried out on small forces of animal life; thus giving engineers an opportunity to experiment with living creatures without necessitating the use of man.

In this way the army makes its bid for the flights of tomorrow, for it is obvious that someday, not far distant, the planes will ride the stratosphere. The saving of time and the smoothness of the currentless air make it an ideal place for air travel. There remains only a matter of time in which to develop its possibilities.

## A Weight Rule Contest Model

*(Continued from page 35)*

tubing and have a lock to prevent the rubber from slipping off. Several washers are placed between the nose plug and prop and the end of the wire shaft should be bent as shown so a winder can be attached, and so the end will fit in a hole protected by brass sheet to engage the free wheeling. A spring is made, and used as indicated to permit the propeller to spin when the motor is exhausted.

### Flying

Many correctly built models never fly well because of poor adjustment, and many poorly built models fly well because of correct adjustment, so care should be exercised at this stage. Place an 18 strand motor in the fuselage. It should be 24" long. Move the wing till a nice glide is had, and then wind the motor about 75 turns. It should climb slightly when launched and then glide down in right hand circles of about 70 feet in diameter. Once it glides well and in the proper size circle the power flight can be adjusted. It should climb swiftly to the right in circles of the same diameter as the glide. If a tendency to stall or "mush" is apparent, put a small block at the top of the nose plug to make the prop pull down. Change the block's size till the power flight is right. If it turns too sharply to the right under power put a small block at the right side of the nose plug, or reverse the procedure if the turn is too little. A small tab of stiff paper can be glued to the rudder if desired, to aid in adjusting.

Once the plane is flying well glue any adjustment blocks fast, and wind the motor tight for a real flight. The model shown was lost after an observed flight of nine minutes.

## NOTICE

In the May issue of the Model Airplane News, on page 47, there appeared, with our advertisement of the new Model "D" Brown Jr. Engine, a free offer consisting of a propeller and oil, in which it was further stated " . . . This is a special offer made only by the Scientific Model Airplane Company." In view of the Junior Motor Corporation policy, in which no premiums are allowed with a Brown Jr. Motor, this may have been mistaken to represent an agreement between the Junior Motors Corporation and the Scientific Model Airplane Company, whereby only Scientific would be allowed to offer a free premium at the discrimination of all other Junior Motors dealers.

Previous to the Junior Motors Corporation no-premium policy, our premium offer had been included in all our engine advertising. This repeated insertion caused the oversight on the part of our agency, in that they had been accustomed to include it in all our engine advertisements and therefore neglected to omit it from our current advertising.

The Scientific Model Airplane Company is fully in accord with the Junior Motors Corporation no-premium policy. We wish to state that this was an error due entirely on our part, and that the Junior Motors Corporation had no previous knowledge of the insertion. We sincerely regret the incident.

**SCIENTIFIC MODEL AIRPLANE CO.**
**Newark, N. J.**

## Proportioning Your Gas Job

*(Continued from page 29)*

engine develops from 0.35 to 0.4 horsepower. The complete power unit mounted, ready to insert in a plane, weighs from 8 to 10 ounces more than a ⅛ horsepower engine mounted in a similar manner (about 34 ounces).

If such an engine were to be used, the structure of the plane, built for a lighter engine, would have to be strengthened. Through the increase in weight of the power plant and structure, the 8 oz. plane could be made easily to weigh 10 oz. per sq. ft. of wing area, or about 4.62 pounds. Such a plane would have a maximum climb of about 880 feet per minute, due to the greater power available.

This may be determined from the chart as follows: First, mark the point at which the 10 oz. per sq. ft. line crosses the imaginary line running vertically through point 4.62. The area reading at the left of the graph for this point of intersection is 7.3. The power of the larger engine is (0.35) hp., whereas the chart shows performance for a (0.2) hp. engine. By increasing the area reading on the chart in the same proportion as the increase in the power, the same performance will be indicated on the chart that would be obtained by the use of the (0.35) hp. motor. A formula was given in the preceding article by means of which the new area reading can be obtained. It is as follows:

$$X_A = \frac{AH}{P}$$

(A) is the area of the model which in this case is (7.5) sq. ft. H = 0.35, the power of the motor to be used. P = 0.2, the power of the motor for which the graph is laid out. $X_A$ = the new reading on the 4.6 pound line.

Substituting the correct values in the formula, we have

$$X_A = \frac{(7.5)\ (0.35)}{(0.2)} = 13.12.$$

Thus the point which has an area reading at the left of 13.12 and a weight reading at the bottom of the graph of (4.6), shows a performance above the 7.8 ft. per minute climb line. Actually, the point rests on about the 880 ft. per minute climb line.

The conclusion may be drawn from this analysis that planes powered with a ⅛ horsepower engine and loaded 10 oz. per sq. ft. should have a wing area of not more than 5.5 sq. ft. of area, if a high rate of climb and long flight duration is desired. Planes with this wing loading but with a wing area greater than 5.5 sq. ft. should be equipped with more powerful engines, (for instance 0.35 hp.), in order to be capable of a high performance.

In the discussion of the design of your gas model it has been established that the proportion of the wing span relative to the tail moment arm should be the same as 30 inches is to 12 inches. By investigation of the performance of various sizes of models powered with a ⅛ hp. engine it has been determined that a model loaded 8 oz. per sq. ft. of wing area will give a maximum performance if it has 7.16 sq. ft. of wing area and weighs about 3.58 pounds.

If your plane is to have a wing loading of 10 oz. per sq. ft. the wing area should not be less than 4.6 sq. ft. nor more than 5.5 sq. ft. If an area of 4.7 sq. ft. is chosen for the wing of this plane it will have a maximum performance.

### Span and Chord

Now that the correct wing area is known for each of these two planes, it is necessary next to determine the span and chord of the wing of each of them so that they will have the required amount of area.

As we proceed, the large plane loaded 8 oz. per sq. ft. will be referred to as plane No. 1; the smaller one as plane No. 2.

Plane No. 1 is to have a wing area of 7.16 sq. ft. which is 1,030 square inches. The procedure now is to determine what the span and chord should be, assuming an aspect ratio of 7.5 to 8.0. If the span is chosen as 7.16 feet, the chord would have to be 12 inches in order to have an area of 7.16 sq. ft., with square ends. However, the tips of the wing should be raked or of elliptical shape. Therefore the area of such a wing would be less than 7.16 sq. ft. If the span is chosen as 7.5 feet and the chord 12 inches, the area can be made just 7.16 sq. ft., if the ends are rounded properly.

The span then will be 90 inches which is three times 30, the span measurement chosen as the basis of our proportion. Three times 4 inches, the original size of the chord, will be 12 inches. Therefore, as the original proportions are to be enlarged three times, the tail moment arm will be three times 12 inches, or 36 inches.

The span and chord of plane No. 2 may be determined in a similar manner. The area is to be 4.7 square feet, which is 677 square inches. The ends of the wings are to be raked, however, so 6% of this area must be added to allow for the area to be cut away by this procedure. The product of the chord times the span, then, should be about 716 square inches. A span of 75 inches and a chord of 9.5 inches will give an area of 713 square inches, which is just about right. The aspect ratio of such a wing would be about eight. It is slightly more than 7.5 as specified in previous pages. However, planes of small wing area and high power should have a fairly large wing span. The higher the aspect ratio, the larger the span will be proportionally.

An aspect ratio therefore will not only be more efficient but the proportionally large span will help to overcome the pro-

peller torque of the relatively powerful motor.

With a span of 75 inches the moment arm should be 30 inches, as 75 is just 2½ times 30 inches, the size of the span of the plane taken as a basis for our proportions. Also, a tail moment arm of 30 inches is just 2½ times 12 inches, the original size.

Summarizing, we have determined that plane No. 1 should have a span of 90 inches and an average chord of 12 inches; and plane No. 2 should have a span of 75 inches and an average chord of 9.5 inches.

For greater efficiency it is wise to build the wings with "taper". This means that the chord should be larger at the center of the wing than at the tips. If the chord near the tip at the point at which the rounding of the tip starts is ⅜ of the chord at the center of the wing, the taper will be of the correct degree.

Then, the chord at the center of the wing of plane No. 1 will be fifteen inches and at the tip the chord will be nine inches.

Under the same conditions, plane No. 2 will have a center chord of 11⅜ inches and a tip chord of 7⅛ inches. The correct size of the wings and tail moment arm of planes No. 1 and No. 2 have now been determined.

### Wing Section

One of the important factors to consider in designing the wing of a gas model is the wing section. This will influence the efficiency of your model to a very large extent. Insomuch as high lift is important from a performance standpoint, low cambered airfoils seldom should be used on duration models; especially if your plane is to have a high wing loading. You should use a section that will give as much lift as it is possible to obtain (at normal flying angles of incidence, not maximum lift).

Therefore high cambered "sections" are advised. There are a number of excellent ones, such as the R.A.F. No. 32, the McBride No. 7 and the Grant X-8.

One of the most important features that a high lift airfoil should have is a high L/D. All high lift sections do not have this quality. One that has it to a high degree at flight angles is the Grant X-8. This section therefore will be chosen for our model.

### Force Arrangement

If you have followed through the procedure outlined in article No. 71, March issue, you will have laid out a plan of the side elevation of your model drawn around the force arrangement that was determined as the most stable one possible, Fig. No. 131. The side view outline shown in diagram D, Fig. No. 134, was decided upon as the one most suitable for our gas model. The force arrangement of this fuselage varies from the most stable arrangement only in one respect: the line of thrust has been lowered slightly. Instead of being ⅞ inch above the line of thrust as shown in Fig. No. 131, it is only ½ inch above it. The other measurements given in the force arrangement are correct for our model.

Of course the figures shown on the diagram are correct only for the 30 inch wing span plane that was used to show the *proportions* of the model. It has been determined that the span of plane No. 1 shall

be 90 inches (3 times 30 inches), and the span of plane No. 2 shall be 75 inches (2.5 times 30 inches). Therefore in order to ascertain the measurements of the force arrangement of plane No. 1, it will be necessary to multiply each one of the measurements of diagram No. 131 by three. For the true measurements of plane No. 2 force diagram each one must be multiplied by 2.5.

The measurements of the planes, then, are as follows:

Plane No. 1: Span, 90"; center wing chord, 15"; tip wing chord, 9"; tail moment arm (M), 36"; nose length (N), 12"; distance of C.G. below line of thrust, 1½"; distance of C.L.A. above C.G., 8.25". The line of resistance is unimportant from a standpoint of plane structure, as it has no bearing on the shape of the side outline of the model. It affects its balance in flight only. Actually the L. of R. will be approximately in the same position. If there is a change in its position it will probably be slightly lower. Therefore we will say it is (3 x 1¼") or 3¾" above the C.G. It will be helpful if you draw out the final force arrangement on the side elevation of your plane. The respective forces, then, will act as reference lines in establishing the other design and structural features of the model.

Plane No. 2: Span, 75"; center wing chord, 11⅞"; tip wing chord, 7⅛"; tail moment arm, 30"; nose length, 10"; distance of C.G. below line of thrust, 1¼"; distance of C.L.A. above C.G., 6⅞"; distance of L. of R. above C.G., 3⅛".

### Size of the Tail Surfaces

Now all the factors required to determine the correct size of the tail surfaces are known. First, we will consider the amount of fin area the gas model should have. The general rule for gas models is as follows:

The area of the vertical fin should equal 7% of the total wing area, when the tail moment arm is equal to one-half the wing span. However, the moment arm in this case is only 40% of the wing span. Therefore, as the product of the moment arm times the fin area must be the same for any given wing area, irrespective of the moment arm length, the fin area should be (5/4 x 7%) or 8.75% of the wing area.

Usually when tapered wings are used, the fin can be made slightly smaller than when wings of constant chord length are used. This is due to the fact that the center of resistance of each half-wing is closer to the fuselage in the case of tapered wings. Because of this fact, fin area should be 8% less than 8.75% or about 8% of the wing area.

The wing area of plane No. 1 is 1030 square inches. Eight per cent of this is 83 square inches, which is the amount of fin area to use.

Plane No. 2 has 677 square inches of wing area. The fin area should then be (0.08 x 677) or 54.16 square inches.

If the general rule for fin area is to be applied rather than the more laborious method of calculation by means of the formula for fin area, the size of the fin determined on the drawing (by use of the cardboard silhouette side pattern) should be modified to equal the area specified by the general rule. If the size of the fin must be changed, the new fin outline should follow the general shape of the old one. Area should be added or subtracted, as required, equally around the entire border of the fin. The same *proportion* of fin area, after the change has been made, should be above and below the extended line of thrust.

### Required Stabilizer Area

It is not necessary to have as much stabilizer area on gas models as on rubber powered planes. This is due to the fact that the moments of inertia about the lateral axis are not as large in gas models. One can readily understand this when they realize that the weights of a gas model are concentrated close to the center of gravity.

A stabilizer area of 25% of the wing area in the case of a gas model is equivalent to an area of 33% of the wing area in the stabilizer of a "rubber" plane. Of course, it will do no harm to make it with an area of 33% for gas jobs, but it is not always necessary. An area of 25% of the wing area should be the minimum for average cases. When in doubt about this point it is always advisable to use 30% to 33% as a stabilizer area value.

As great stability is desired in the model being designed, an area of 30% of the wing area should be chosen, provided the stabilizer moment arm is three times the average wing chord. In this case the average chord is 12 inches, while the moment arm is 36 inches (Plane No. 1). Thus, the moment arm is just three times the chord.

The stabilizer of plane No. 1 would have an area of (0.3 x 1037) or (311) square inches. Plane No. 2 should have a stabilizer with an area of (0.3 x 677) or (203) square inches.

Next month it will be shown how the tail areas may be calculated by use of the formulas.

## N.A.A. Jr. News

*(Continued from page 23)*

12th and 13th. Leaders from all over the country attended this event. Seventy-five were present; which was a goodly number, judging from attendance at previous conferences of a similar nature. It was really a history making event. Several rooms were put at the disposal of the conference members by the Hotel Lafayette, which was headquarters for delegates while in Washington.

Some of the delegates were:

Messrs. Plummer of Trenton, (Mr. Plummer is head of the N.J. state police), Allen of Pittsburgh, Berry of Philadelphia, Booton of Asheville, N.C., Capo of Boston, Fritz of Philadelphia, Jellison of Akron, Light of Germantown, Lewis and Marchi of Boston, Roberts of Philadelphia, Polk of New York, Schade of New Briton, Connecticut; Somers of St. Louis. These gentlemen were among the first arrivals, but were soon joined by:

Jesse Bieberman, Philadelphia; Charles H. Grant, editor of MODEL AIRPLANE NEWS; Colin Kerr Cameron, "Flying Aces Magazine"; C. G. Colby, "Bill Barnes Air Trails"; Lawrence Smithline, Carl Schmaedig, Roger Hammer and Frank Zaic, New York; Zecchitella, Newark; Michael Roll and Frank Dallaire, Detroit; and Miss Frances Alexander, Akron.

The conference marked an important milestone in organization for model aircraft advancement in the United States. It is fact now . . . not fancy . . that official rules are written by and for the model builders. We wish you could have had the opportunity of looking in on the ardently attended and earnestly followed discussion sessions. Everyone registered made a real contribution to U.S. Model Aviation, and deserves three (at least) rousing cheers!!!

And special bouquets to our hardworking model aircraft journalists who were active participants, and who decided during the conference on formation of a publishers' section of the Academy. C. B. Colby, editor of "Air Trails"; Charles H. Grant, editor of MODEL AIRPLANE NEWS; Gordon Light, Aviation editor of "Air Trails"; Lt. John Sherer of "Modern Mechanix"; Phil Zecchitella of 20th Century Press; Frank Zaic of "Model Publications," were leaders among the model aircraft scribes on hand.

Detroit, location of the 1938 National meet (scheduled for July 6 to 9) and the Detroit Exchange Club, sponsors of this 12th annual event, were represented by Michael Roll and by Frank and Joe Dallaire. Official Washington was represented by Richard C. Gazeley, Chief of the important Safety and Planning Division of the Bureau of Air Commerce; Mr. Robert W. Hambrook of the Federal Office of Education and Lt. John Greenslade of the Bureau of Aeronautics, Navy.

Al Lewis and Bob Sommers were impresario and major domo respectively for the weekend, and did a swell job. Al, as president of the Academy of Model Aero-

nautics, presided over the Academy sessions. Bob, as A.M.A. chairman of the First Annual Conference, took charge of the conference sessions. Academy officers, of course, were in attendance 100%, including in addition to Al and Bob, H. M. Jellison, Vice-President, and Ed Roberts, Secretary-Treasurer.

The first quarterly issue of the "Journal" of the Academy will contain detailed information on the conference. It will be shortly released through the creative efforts of its various authors—yes sir! Complete rules and regulations on the National Meet are also under preparation and will be available at an early date.

The New York World's Fair were hosts to all conference delegates at the Saturday noon luncheon. President Grover Whalen of the Fair was personally represented by Miss Lorena Hickok. Major Lester Gardner, Secretary of the Institute of Aeronautical Sciences, was an interested guest at the luncheon.

No one was very much surprised when discussion caused the conference to adjourn later than the scheduled time. After every topic had been thoroughly threshed out, the conference was transferred to the Dupont Circle headquarters of the N.A.A., where delegates availed themselves of the opportunity to became better acquainted socially while enjoying a buffet supper and the motion pictures of previous national contests, which Bob Sommers brought with him from St. Louis.

Final phase of the conference came Sunday afternoon with a sightseeing tour of the nation's capital, which included points of interest in the city, inspection of Army and Navy airports, and a visit to the Smithsonian Institution; where Paul Garber, Curator of Aeronautics, led a personally conducted tour of the many historical exhibits of pioneer and modern aircraft on display. Word to the wise: If you couldn't make this *first* conference, begin now to plan your attendance at the second "Annual" event next year.

But so much for small talk . . . the results are summarized in following paragraphs. And remember, they represent the majority views of the nation's model leaders . . . if you disagree on some points (and you probably wouldn't be normal unless you did) be sure to be on hand in 1939. You can be sure you'll have every chance to be heard. In the meantime, how about filing your views with Academy prexy Al Lewis, who's a long-suffering guy, but who you can be sure will see that you get a real hearing.

### *Official Changes For 1938 In Model Aircraft General Competition Rules And National Meet Events*

Adapted by the Academy of Model Aeronautics and the First National Model Aircraft Conference and approved by the Contest Board of the National Aeronautic Association.

General Competition Rules: (for all sanctioned meets and record trials, including the National Championship Meet at Detroit).

Official gasoline engine powered model flights are limited to a 30-second engine run.

Wing loading of gasoline engine powered models shall not be less than 10 ounces per square foot of wing area. Maximum weight must not exceed 7 pounds.

All contestants flying gasoline engine powered models must hold an official N.A.A. Gas Model Flyers license, issued to members of the Gas Model Division of the N.A.A. upon signing of the pledge to follow approved gas model flying rules.

Gas Model builders under 16 years of age may now obtain an official N.A.A. Gas Model Flyers permit which enables them to fly gas models under the supervision of a regularly licensed N.A.A. gas model member over 16, who shall be responsible for the conduct of the younger flyer. *Only licensed N.A.A. gas model members over 16 who are certified by N.A.A. Contest Directors can assume this responsibility.*

Timers at outdoor events will remain on the field within a prescribed circle not to exceed 200 feet in radius, and timers will

use no means other than normal vision to keep models in sight (colored glasses or sun shades permitted). The Contest Director shall have sole authority to designate the starting point and to prescribe the limits consistent with the above in which timers shall operate.

Stick models (both indoor and outdoor) should have maximum cross-section area of stick not greater than $L^3/200$, where "L" equals the length of the stick. Outdoors any type of motive power permitted except gasoline engine power.

Each contestant shall assemble all lifting surfaces and fuselage of his model. The design may be obtained from any source. Only the builder may fly the model for records.

National Meet Events: (the following changes in events and rules pertain specifically to the 1938 National Meet).

Two separate rubber powered cabin events will be held outdoors at the National Contest: One event under American cabin rules, which will also serve as the Moffet elimination contest; and the other under Wakefield rules for Wakefield team eliminations. The first six winners of the outdoor cabin event are to be chosen as the American representatives in the International Moffet finals. The rules for the American outdoor cabin event limit wing area to be not less than 100 square inches and not more than 200 square inches, with the standard weight rule of 3 ounces for every 100 square inches of wing area. The Stout Trophy will be featured as the first place award in this outdoor cabin event. Any type of power is permitted except gas.

Both the indoor cabin and the indoor stick events are limited to entries having from 30 to 150 square inches in wing area.

The minimum diameter of the wheels of an indoor cabin model shall be not less than one inch. The minimum diameter of the wheels of an outdoor cabin model shall be not less than one and one-half inches.

Maximum weight for radio-controlled models shall not exceed 25 pounds.

Each contestant shall assemble all lifting surfaces and the fuselage of his model. The design may be obtained from any source. Only the builder may fly the model for records.

With the exception of the above changes, the 1938 National Meet Rules remain the same as last year. 1938 Meet events are: INDOOR EVENTS: Stick, Cabin. OUTDOOR EVENTS: Stick, Cabin, International Wakefield Eliminations, International Moffet Contest, Flying Scale, Gas Powered Endurance and Radio-Controlled Events.

We welcomed ten new gas chapters to the Gas Model Division of the N.A.A. this past month. They come from al lover the country; from Denver, Colo., Jacksonville, Fla., Baton Rouge, La., Baltimore, Md., Yakima, Wash., Kansas City, Kans., Trenton, N.J., New York City, N.Y., Cincinnati, Ohio, and Seattle, Wash.

Then there are five other new chapters which are composed of builders of rubber powered models and of builders of gas and rubber models mixed. Besides these new chapters, there are several more in the "hopper" whose applications were received during the month, but whose charters have been delayed due to the press of work at Washington following the conference. So if your group has been waiting for their charter, just sit tight. It'll be along soon.

Model builders in smaller communities who are desirous of forming a chapter will be glad to receive this suggestion: It is not necessary to have all one type of builders in a chapter in order to obtain a charter. If there are not enough model builders in your community to form a gas or rubber chapter exclusively, it is permissible to band together in a chapter which will include every type of builder. This procedure has proven beneficial to all members. For instance, gas builders do not lose touch with their first love, rubber-powered ships; and at the same time they can be supplying a very real need to their less advanced brothers who are anxious to build bigger and better models. Mixed chapters in large cities are desirable because of the variety of ideas and results produced.

A convention of the gas model clubs of Texas was held on February 26 for the purpose of organizng a Southwestern Gas Model Association. Representatives of the clubs of Houston, Galveston, Corpus Christ, Fort Worth, Tyler, San Antonio, Waco and Dallas were present. As yet the boys in Dallas have no club, but are desirous of forming a junior chapter with special emphasis on gas flying. The founders of the Southwestern Gas Model Association certainly do have the right idea in getting organized; it helps model aviation all down the line.

The Quaker City Gas Model Club is going to continue its monthly meets to the

September contest, with promises of getting bigger and better. Their trailer is going to the "Nationals" this summer, which will probably be its longest trip. They've been getting quite a lot of newspaper publicity of late, which is a mighty good thing for model aviation.

A new junior indoor record was chalked up on February 26 in the Ritchie Coliseum at the University of Maryland. A class "B", R.O.W. fuselage model flown by Matthew S. Smith of Washington, D.C., took off and stayed up 7 minutes, 50 seconds flat. Matthew said it could do more than that if he had had enough ceiling for it. Nice going, Matthew!

And another junior indoor record was broken up in Boston, Massachusetts, on Feb. 19, when a helicopter belonging to Ralph Brown of Arlington, Mass., stayed up for 2 minutes, 15.5 seconds. Al Lewis, President of the A.M.A., was timing with G. Munnick.

A wind tunnel under construction by the Jordan Marsh—Boston Traveler Junior Aviation League is nearing completion, after almost five years' hard work. The design of the tunnel was conceived by John P. Glass. Practically no changes in the plans have been made since the designs were drafted. It is 16 feet long and 8 feet in diameter. Through a practical and very ingenious method of using a stretched blanket for a filter, a pressure of about five pounds per square foot is obtained. The airflow may be regulated from this to a speed of ten feet per second at the top. The model to be tested is suspended about two feet behind the blanket, where it may be placed through a celluloid-covered door in the side of the tunnel. Torsion balances are used, completely automatic in their operation. They measure the force on the model without allowing it to move, and they may be made as sensitive as desired. The instruments are sensitive to less than 1/1000 of an ounce.

## Building The "Tyro I"

*(Continued from page 10)*

With the rudder in line with the fuselage, slide the wing into a position of equal dihedral for each panel in relation to the stabilizer, by sighting from the front or rear of the glider. Then the wing and stabilizer may be cemented to the fuselage and several successive after-coats of glue applied at these points. This will strengthen the joints, and fair or streamline the wing and stabilizer to the fuselage.

### Adjustment

Adjust the glider in an open field by adding weight in the form of modeling clay to the nose until the craft glides smoothly. It will be found that when this point is reached, the glider will balance about one and a half inches forward of the trailing edge. This point of balance will vary according to the weight of the wood used in the construction.

Bend the trailing edge of the rudder to the left for a left circle, and to the right for a right circle.

Grasping the glider by the fuselage with the thumb and first two fingers just below and in front of the wing's trailing edge, point the model's nose upwards slightly and launch with a "heave."

Should the model show a tendency to go into a spiral dive, correct by bending down the trailing edge of the wing on whichever side the model turns.

By carefully bending the various tail units, the builder will be able to see the effects this will have on the glider's flight and can learn for himself the principles of correct adjustment when coupled with good design.

After recording the best flights, moisten the top side of each wing panel slightly with water, permitting each to dry naturally. It will be found that this produces a semi-airfoil shape on both panels which may be decreased or increased by breathing on the wing and bending the balsa wood with the fingers. Immediate benefits from this airfoil should be apparent in increased duration and smoother flights.

Thus, by building and flying the "Tyro I" you have learned by actual experimentation the value of an airfoil section on the lifting surfaces of an airplane, the precoating technique and the ease of working with templates.

## The Plane on the Cover

*(Continued from page 29)*

gear is composed of two huge, specially designed floats attached to the wing in a full cantilever pier mounted directly into the engine nacelles. The floats have a scientifically constructed step and running surface which has taken several years and a great deal of money to develop. The fuselage is of all-metal construction and is in rectangular cross section. In the nose is the forward gunner completely enclosed in a special, revolving machine-gun turret. He also acts as torpedo officer and has a special sighting window directly below and in front of his seat. During offensive patrols he lies flat on his belly and sights through this opening on the target. When everything is in readiness he signals to the rear and the projectile is released.

To the rear and immediately above this opening is the main control cabin, housing the pilot and co-pilot. They are situated in a glassed-in structure high in the hull, commanding an excellent view of take-off and landing areas. Below them in the hull is the radio operator and navigator's office. It is his job to keep the ship on course and to send and receive commands and notations from the fleet patrol base.

Also in the lower cabin is the armament officer who handles the giant 1,000-pound

Whitehead Torpedo. This is mounted in a horizontal position within the hull below the crew's quarters. The entire lower surface of the craft opens and disgorges the deadly instrument. After it has been launched the two halves swing inward and seal the opening. Above, on the broad back of the ship, is the rear gunner and spotting officer. Both gunners are equipped with a single, electrically controlled Lewis machine gun mounted on special swivel structures, and capable of firing 1,200 rounds per minute.

The wing span is 79 feet, 4 inches, and construction is of all metal with alclad sheet covering. Regulation ailerons and landing flaps of the split, trailing edge type are included. Much valuable experience is hoped to be gained in the use of landing flaps on seaplanes as this arrangement has not been tried previously. Directional control is attained by a single, high, cantilever rudder. Immediately below is the "shark fin" rudder area found necessary on seaplanes to increase the lateral area so that better lateral control may be exerted.

The engines are equipped with the latest Curtiss electrically controlled "full feathering" propellers which increase the performance enormously. Few performance figures have been released, but the Hall-Aluminum preliminary specifications call for a top speed of 240 miles per hour, with cruising at 215. This is amazing performance when it is borne in mind that this giant, twin-engined ship is capable of exercising the duties of what formerly required three separate and distinct planes! The ship is now undergoing experimental tests at Naval Proving Grounds Dahlgren, chief of which is the rough water landing, take-off, and taxying experiments. The Hall-Aluminum XPTBH-2 will undoubtedly hail the dawn of a new era in military plane construction should the outcome of its tests prove up to par with its designers' and builders' expectations.

## Air Ways

*(Continued from page 37)*

and the gliders in the auditorium at the same time. The extremely low ceilings in both halls prevented the making of spectacular flights. Nevertheless the following clubs entered turned in a fine showing: The Lo-Ko Airplane Club, Section 4 Leader's Club, Chicago Aeronaut Club and the Illinois Model Airplane Club. There were fifty scale models entered in the meet.

Prizes were presented to the winners February 8th, 1938, on the stage of the Logan Theatre, which acted as co-sponsor of the meet with Kosciuszko Park. The high point man of the meet was Robert Albrecht, a junior of the Section 4 Leader's Club, who placed first in the Class A Gliders, second in the R.O.G. and second in the Scale Model events. The second highest point man of the meet was Milton Huegelet, a senior of the Aeronauts, who placed first in the Glider event and fourth in the R.O.G. Albrecht received a gold trophy and Huegelet a gasoline motor.

The Parent's Club of the Park provided

a banquet for the boys at which the scale models were exhibited. A fine program was presented by the Accordion Club, headed by Joe Thompson, also a member of the Leader's Club. The meet was sanctioned by the National Aeronautical Association.

## Winners and Prizes Received

| Place | Winner | Prize | Member of Club | Donated by |
|---|---|---|---|---|
| | | *Class A Glider* | | |
| 1st | H. Negri | Wrist watch | I.M.A.C. | Polish Nat'l Alliance |
| 2nd | E. Bulinski | Skein of rubber | I.M.A.C. | |
| | | *Junior Glider A* | | |
| 1st | R. Albrecht | $3.00 Aircraft Certificate | Leaders | Aircraft Model Airplane Co. |
| 2nd | B. Robertson | Skein of rubber | Leaders | |
| | | *Senior R.O.G.* | | |
| 1st | M. Huegelet | Wrist watch | Aeronauts | |
| 2nd | D. Turner | $2.00 Certificate | Aeronauts | |
| | | *Junior R.O.G.* | | |
| 1st | L. Tucker | Dart game | Aeronauts and Leaders | Kosciuszko Park Parent's Committee |
| 2nd | R. Wold | $2.00 Model Kit | Leaders | Megow Model Airplane Co. |
| | | *Senior Scale Model* | | |
| 1st | W. Zurek | Quaker Flash gas model Kit | Leaders | Megow Model Airplane Co. |
| 2nd | W. Mierzwa | Model Kit | Leaders | |
| | | *Junior Scale Model* | | |
| 1st | H. Christian | Comet Trophy | Leaders | Comet Model Airplane Co. |
| 2nd | R. Albrecht | | Leaders | |

We are indebted for this information to Mr. Bernard Schwartz, contest director.

### Ohio

News comes from the Cleveland, Ohio, squadron of the Junior Aviators that three members won nation-wide recognition for their craftsmanship in reproducing replicas of Major Al Williams' Gulfhawk. Two seconds and a third were won by the Cleveland boys, from a field of nearly 300, in the national finals of the Scripps-Howard Gulfhawk Scale Model Contest. These winners were: Frank Hoffer, 22, of 3608 Library Avenue, competing in the open division for contestants over 18 years; John Reye, 17, of 3283 W. 90th Street, competing in the senior group for builders between 14 and 18, and Bobby Martin, 13, of Bennett Road, North Madison, competing in the junior group. The scores of ships competing in the event represented twenty-three cities in the United States, and one each in Canada, Norway and Germany. All of them were champions, having won city-wide honors in preliminary elimination contests.

The nation-wide winners in the three divisions, open, senior and junior, were: Charles Bleitner, 23, of St. Louis, Missouri; William Sharp, 17, of Avalon, Pa.; and Michael Jugan, 13, of Duquesne, Pa. Sharing second place with the two Cleveland winners were Milton Hosman, 13, of Denver, Colorado. Third place went to Richard Jennings, 21, of San Francisco, Cal.; Robert Dittmer, 17, of Denver, Colorado, and Bobby Martin.

### Louisiana

Mr. Whalen J. Norman of 610 City Park Avenue, New Orleans, Louisiana, wishes to announce that the Gulf States Model Airplane Meet will be held in New Orleans on Saturday and Sunday, June 18th and 19th, under the sponsorship of the New Orleans Junior Chapter of the N.A.A. This will be the first meet of its kind and size ever held in this section of the country. Any N.A.A. chapter or individual who is a member in good standing is invited to

compete in the followng events:

Flying Scale, Endurance classes C and D Gas, Exhibition Scale.

Entries will be accepted from the Gulf States only; Texas, Louisiana, Mississippi, Alabama and Florida. All correspondence should be addressed to: Gulf States Model Meet, c/o Delgado Trades School, 610 City Park Ave., New Orleans, La.

This is the first competitive meet ever sponsored by the New Orleans Junior Chapter, but plans indicate a most successful meet. Mr. Norman will be contest director.

### Massachusetts

The Jordan Marsh-Boston Traveler Junior Aviation League announces its championship New England Model Plane Contest, which will be held June 4th and 5th. The outdoor events will take place at Harvard Practice Field, Cambridge, Mass. The indoor competition will be flown at the North Station Sports Arena, Boston, Mass. This contest is the largest event to be held yearly in the New England States and is one of the oldest annual contests held in the country. The first one, we understand, was inaugurated in 1929.

All outdoor models are to be plainly marked with name and address of builder, and must be officially "weighed in" and checked Sunday afternoon, between 12 and 2 P.M.

A victory dinner will be tendered winning contestants on Saturday evening, June 4th. At this banquet famous fliers and aviation personalities will speak and all forces of the nation's air defense are expected to be represented.

Indoor winners and club members who have won awards during the season will be invited to the dinner, as well as famous model aviation leaders.

More information concerning this contest may be obtained from the Contest Director, Junior Aviation League, Jordan Marsh Company, Boston, Mass.

INDOOR EVENTS.

Rubber Power. At Boston Garden, North Station.

Gliders, hand launched. Class A-B.

Stick type, airplane, R.O.G. Class A-B.

Fuselage type, airplane, R.O.G. Class B-C.

Stick type, airplane, hand launched. Class B-C.

Most spectacular flight of any type plane, in Junior, Senior or Open Class.

OUTDOOR EVENTS.

Rubber Power. At Harvard Practice Field, opposite Harvard Stadium.

Stick type, airplane, hand launched. Class C and D. Juniors—under 16 years.

Fuselage type, airplane, R.O.G. Class C and D. Seniors—16 to 21 years.

Glider, either H.L. Class B, C or D, or Tow Line Open Class—over 21 years. Class C, D or E.

Most originau outdoor flying model for Wing Overs Trophy in Junior, Senior or Open Class, gas engine or rocket power excluded.

Class A is to 30 sq. in.
Class B over 30 to 100 sq. in.
Class C over 100 to 150 sq. in.
Class D over 150 to 300 sq. in.
Class E over 300 sq. in.

### Notice

We are sending a special call out to all model airplane clubs to send in information concerning their activities and proposed contests. Many model builders wish to know where and what contests are being held. Unless the clubs keep us informed concerning this we are unable to give accurate information. Will the club secretaries please send to us a schedule of their activities each month for publication? All pictures and information concerning your club activities will be welcome and printed in the Air Ways columns. Of course photographs must be of good quality in order to have them reproduced in the magazine.

**When you send pictures for publication in AIR WAYS be sure that they are good and clear prints, otherwise they can not be published.**

## Gas Lines

*(Continued from page 25)*

performance is not considerably altered by this. This last remark is extremely interesting in light of the discourse presented in the first part of "Gas Lines." Now the total weight of the ship is four pounds. Bowers now has built a ship with a ten ounce wing loading and a span of five feet. He has the right idea if he wishes performance; that is, as the wing loading goes up decrease the wing area.

Picture No. 3 shows Mr. J. K. Coppage, who is contest director for the Atlanta Aero Engineers, N.A.A. Chapter and formerly I.G.M.A.A. Unit No. 62. The club's headquarters are at 2049 Robson Place N.E., Atlanta, Georgia. Mr. Coppage is shown with two of his gas models, "Papa" and "Sonny." The large one is a Super-Buccaneer, Brown powered, and the small one is a thirty-five inch span Elf powered gas job. We believe the Engineers have the distinction of being the first gas club to form under the N.A.A. They received their membership cards last December.

Jack Roll of 1364 Eighth Avenue, San Francisco, Calif., sends us picture No. 4, which shows the unusual motor installation in his gas job. Mr. Roll says that the gas tank is the mounting for the motor. It is made from a stamping with the dural plate cut to the shape of the crankcase and riveted to it. The whole unit is mounted on a vertical dural firewall which is fastened to a plywood bulkhead by four screws. This is easily removable. The propeller also is unique, and is an adaptation of the Maynard Di Cesare propeller. By actual measurement, Mr. Roll says, this arrangement gives more thrust, with the same revolutions per minute, than that of a standard prop. The air is drawn in toward the hub and as a result the motor runs cooler. The pitch of this propeller, also, can be changed readily and broken blades may be easily replaced. Mr. Roll offers to furnish information concerning the building of this type of propeller to any model fans who will write him. The plane with this installation has had over sixty flights and won second place in the junior division at the California State Fair Contest last Labor Day.

We hear from Mr. Jerome E. Smith of 310 S. Lonise Street, Glendale, Calif. He sends us Picture No. 5, which shows Smith and Bill Brechow with the plane they built. The ship was inspired by remarks from other fans that low wing gas jobs could not be built to fly. This was in the summer of 1936. Well, these young men got busy with the intention of "showing up the crepehangers." The first ship was built and flown with not a great deal of success. However, not discouraged, they gathered together the pieces and after a couple of months "made all the little pieces into one big piece," and tried the stunt over again. About a dozen flights followed but the ship was spirally unstable. Mr. Smith says:

"However, after reading several articles in MODEL AIRPLANE NEWS we took several square inches off the top of the rudder and moved up the batteries in order to bring the center of gravity closer to the center of lateral area. Another trial followed. On this test flight it flew perfectly, so that everything was set for a contest on December 19th, 1937. The first flight was a failure because of dead batteries. However the second one did the job, for the ship took first place in the low wing event."

We thank Mr. Smith for these very interesting remarks. The span of the ship is forty-eight inches; area, 702 square inches; the airfoil, N.A.C.A. 2515 and 2315; dihedral, eight degrees. The total weight is four pounds, five ounces. Mr. Smith also tells us a large meet is to take place at Los Angeles on June 12th, 1938, and he is hoping to see a number of easterners on hand to make the competition more interesting.

Mr. H. H. Gernandt of the Curtiss Wright Technical Institute, Glendale, Calif., shows us a high speed gas job in picture No. 6, built by employees of the Baby Cyclone factory at Grand Central Air Terminal, Los Angeles, Calif. This ship was flown successfully at Murroc Dry Lake and proved to be very fast. The speed was not officially clocked however. The sides of the plane are made of balsa sheet. The straight lines should make it a very easy job to build, and it is particularly interesting from this standpoint.

Picture No. 7 shows Albert Baird's first gas job. Baird lives at Lyndonville, New York. The ship has a seven foot spread and is equipped with air wheels and selftimer. The ship also has a removable battery rack and outside opening for booster batteries. Baird says that this is

the only gas job in his vicinity and is causing considerable interest and comment.

Picture No. 8 shows us another use for gas motors. This speed demon was built by Bill Atwood of 305 West Dryden, Glendale, Calif. This little job, on its trials, made a sped of 38.2 miles per hour, which is an unofficial world's record. It is designed as a class C job. In this class the motor displacement cannot be over fifteen cubic centimetres, nor the complete weight of the body, ready to run, more than seven pounds. The bore of the motor is one inch and the stroke 1⅛ inches. The displacement is 14.2 cubic centimetres. The engine is a specially built job all through and employs twin carburetors operating through double, ball bearing crankshafts. In starting the engine only one carburetor is turned on, and after the boat is running on the water the other carburetor may be turned on as the boat passes the launching platform. The motor turns over 14,000 revolutions per minute on the bench and between 10 and 12,000 in the water. The hull of the ship is carved from balsa wood in two halve sheets, and after hollowing out the inside, a mahogany plywood bottom is inlaid. This takes the full strain of the motor and all its accessories. The hull is covered with silk and given four coats of lacquer filler. Then, after sanding, the paint is sprayed on. The length of the hull is 26 inches; the bottom, 11½ inches. The weight of the complete outfit, ready to run, is five pounds. The propeller is 2½ inches in diameter with a pitch of 4¾ inches.

Leon Shulman of 1514 West 7th Street, Brooklyn, New York, sends us a picture of his very unusual gas model. It is shown in picture No. 9. As you can see, it has only one landing wheel. On the sides small skids protrude, which hold the model upright while it is resting on the ground. The ship has been built with a deep fuselage to keep the center of lateral area low. The line of thrust is quite a distance above the center of gravity, yet far enough below the wing to cause excellent climbing tendencies. The wing has a span of fifty-four inches and employes a modified McBride 7 airfoil. It is powered with a Trojan motor.

Shulman says the plane has a glide of approximately 20 to 1. Unquestionably the ship is a beautiful performer, but we cannot help but raise our eyebrows at this claim: inasmuch as the L/D of most wings is not over 22. This means the glide would be 1 in 22 for the wing alone, not including the resistance produced by the body and other parts of the ship. In gas models and in large ships the parasite drag of the body, etc., usually amounts to 30 to 40% of the total drag of the airplane. This would mean that the gliding angle of an airplane, whose wing had a L/D of 22, would be about 14 to 1. With this model flights of more than eight minutes have been obtained on an engine run of forty-five seconds.

Picture No. 10 shows Joseph Cagigaly Calas of Malecon No. 16, Habana, Cuba, with the uncovered framework of his gas model, equipped with a Gwinn motor. He says he and Mr. Jesus Prats Rodriguez of Consulado No. 75, Habana, have formed a model airplane club. The members of this club consider MODEL AIRPLANE NEWS the foremost authority on model aviation. This last comment, we assure them, is greatly appreciated. Mr. Rodriguez is also an ardent model builder and co-sender of this picture.

Picture No. 11 is not what it appears to be. It is probably one of the most ingenious pictures ever taken by a gas modeler. The feat of obtaining a picture of a full size man, the gas model and the large Stinson was accomplished by superimposing three plates, one on another. The young man is James Condon of 100 Mount Pleasant Street, Newark, New Jersey, standing in front of his gas model. Actually the gas model is not as large as it seems to be; it is just an ordinary size. Nevertheless, it makes a very unusual and realistic looking combination. One might take this model to be a new type of man-carrying sport plane, many of which have been developed recently.

Ed Sendwoda of 1440 Macdonald Avenue, Brandon, Man., Canada, sends us picture No. 12, which shows him holding his first gas model. As yet he has not attempted to fly it but is hoping to do so soon. The ship has rather unique and pleasing lines. We wish him the best of luck with this ship.

## CLUB NEWS

### Pennsylvania

The Philadelphia Gas Model Association announces its first annual contest, open to contestants in the eastern part of the United States. The contest will be held on May 29th, at the Somerton (Flying Dutchman) Airport, Somerton, Philadelphia, Pa. The airport may be reached from the Roosevelt Boulevard (U.S. Route 1) by turning west at Red Lion Road about one mile. Directing signs will be posted along the road. Flying will start at 10:30 a.m., and will continue until 5 p.m. The contest will be held on the scheduled date unless conditions absolutely prevent, in which case it will be postponed to the next Sunday, June 5th. The meet will be under N.A.A. sanction and the N.A.A. rules of a 30 second motor run, wing loading of 10 ounces per square foot, and maximum weight of 7 pounds will be in force. Only members of the gas model section of the N.A.A. will be permitted to compete, with the exception of those under 16 years of age, who may compete under the supervision of a member of the gas model section, who has received the approval of his contest director. N.A.A. membership cards will be required. From applications already received the meet promises to be one of the largest ever held in the East. There will be a sufficient number of worthwhile prizes. For additional information and entry cards write to Jesse Bieberman, 3219 E. Brighton St., Philadelphia, Pa., and enclose a stamped, self-addressed envelope for reply.

### New Jersey

Mr. Carl A. H. Eldredge, Jr., invites all gas model builders interested to join the South Jersey Gas Model Airplane Association. The members at present range from 15 to 26 years of age. The club is quite active and attends all contests it possibly can. A large trailer is used to transport the models of the members. Last fall the S.J.M.A.A. won the Blue Ribbon First Prize in the Camden County Hobby Show. Regular meetings and contests are held by the club. All those interested should write to Frank Hernandez, Jr., 208 Edgewood Avenue, Audubon, New Jersey.

Mr. Frank Krysiak, supervisor of the Linden Model Aircraft Club of Old City Hall, Linden, New Jersey, makes what may be a rather interesting remark concerning the age limit for gas model fliers. You may or may not agree with him. He says:

"It would tend to discourage building and flying of rubber powered models, which certainly should be encouraged if anything. It is through this phase of model building that the boys will learn to build models. Let them start at the bottom and we are sure that they will be better builders. Certainly it will be more economical for them to learn how to build models the right way with a cheap plane, than to start right off and invest about twenty-five dollars in a gas model, only to have it crack up."

There is a great deal in what Mr. Krysiak says in regard to the common results experienced by novices in gas model aviation. We do not believe it is the right policy to make rules which give the impression of domination or forcing the boy to refrain from gas model building, even though he is below the age of 16. We believe that these boys should be *encouraged not to build* gas models until they receive proper instruction and experience with rubber powered models. Any organization or persons who use domination or force only antagonize those with whom they come in contact. If the boy will not listen to reason the only way for him to learn is to find out for himself. Also, it is true, that there is a large number of young men below the age of 16 who are expert builders and far from the novice class. These must not be forgotten.

Mr. Krysiak informs us that the New Jersey State Gas Model Championship Meet will be sponsored by this club, under his direction. It will be held on Saturday, June 25th, at Hadley Airport. Only residents of New Jersey will be eligible to compete, the winner being recognized as the state champion. An event for out-of-state competitors may be added. Many prizes and awards will be given. Entries are limited to one hundred competitors, and will be received by mail only. An entry fee of twenty-five cents is charged. For further data write the Linden Model Aircraft Club, at the above address.

Here is something unusual. Mr. LeRoy Weber, Jr. of Blair Academy, Blairstown, New Jersey, writes that there is a gas model club at this academy. He says he believes this is the only club in a

private school at present. There are twenty-five members, who have fifteen gas models among them. The club has obtained the permission of the Department of Commerce to use the Martin's Creek Airport at any time. They now fly here regularly on week-ends. The officers are:

President, LeRoy Weber, Jr.; vice-president, Jay C. Miller; secretary-treasurer, Phillip Satta.

They will hold a meet on May 21st, from 10 a.m. to 6 p.m., at the Martin's Creek Airport. Many prizes will be given and all are invited to attend. The airport is about six miles north of Easton, Pa. Mr. Weber will give any further information desired to those who contact him.

### Pennsylvania

We hear from Mr. C. A. Castellano, chairman of the contest committee of the Anthracite Gas Model Airplane Club of 1010 Jackson Street, Scranton, Pa. He tells us the club, now a chapter of the N.A.A. and formerly a unit of the I.G.M.A.A., will hold its second annual contest on Sunday, July 17th, at one of the two Scranton airports. The site will be chosen shortly. The contest is for gasoline powered models and will have the usual timer and duration events, as well as such events as stunting and construction. A large number of prizes will be given. The contest is interstate, with invitations to compete extended to everyone. For further information write Mr. Castellano at the above address.

### Washington, D.C.

The largest gasoline model airplane contest that has ever been held anywhere in the Southern Atlantic States, has been definitely arranged for Washington, D.C., on May 21st and 22nd.

The site or scene of the contest will be the Skyhaven airport, which is located at Suitland, Maryland, about eight miles from the center of the city, and can easily

be reached by auto or bus. Arrangements have been made to accommodate both the contestants and the spectators.

Full details and entry blanks may be obtained by addressing Frank Elvidge, Chairman, Southern Atlantic States Model Air Race Association, 1616 Kay Street, N.W., Washington, D.C.

### Michigan

The old I.G.M.A.A. Unit No. 52, the Jackson Gas Model Club of 636 St. Clair Street, Jackson, Michigan, has joined the N.A.A. Its members seem to believe that the I.G.M.A.A. is "dead." However we wish to "put a flea in their ear," so to speak. An association is now in the process of taking form which will be composed of all the old members of the I.G.M.A.A., sort of a big brotherhood of the pioneers of model aviation. More news concerning this will be forthcoming in our next issue.

### Illinois

The Midwestern States Gas Model Contest, inaugurated so successfully in Chicago last year, is to be repeated on August 7, 1938. This is the largest gas meet in the midwest, and is sponsored by the Gas Model Aeronauts, with headquarters at Gage Park, 2411 West 55th St., Chicago. Following is a digest of the rules:

The contest is a limited engine run consistency event, and is open to all. Three official, or nine delayed, flights will be allowed. Official flights are those with a motor run of from 15 to 30 seconds. The contestant with the greatest total combined time made in official flights shall be the winner.

The contest director is Mr. R. L. Webber, well-known Chicago businessman and gas model enthusiast. Any inquiries regarding the meet may be addressed to him, at 217 N. Desplaines St., Chicago, and will receive prompt attention.

## CORRECTION

We wish to make a correction. In our April issue we stated that Frank Knapton is secretary of the Gas Model Airplane Association of Southern California, Inc. This is incorrect. The secretary is J. C. Williams, 6659 Sixth Avenue, Los Angeles, and the club's headquarters are at the Manchester playgrounds in Los Angeles.

The next contest to be held by the association will be on June 12th and will be run under the regular rules used at other contests. There is an entry fee of fifty cents which should be mailed to Mr. Grant Carder at 1640 W. 60th Street, Los Angeles, Calif.

### Gas Model Insurance

We believe that gas model insurance is a valuable asset for all gas model builders. It is possible to obtain insurance for one dollar per person, provided one thousand fans can be enrolled for protection. We will be very much interested in hearing from all gas model builders as to whether or not they would like to take out any form of insurance, that would protecf them against property damage and personal liability while flying their gas models. Write to Mr. Charles Grant, MODEL AIRPLANE NEWS. 551 Fifth Avenue, New York City, expressing your views.

## CONTESTS

The following clubs have announced contests:

On June 11th, the Germantown unit of the Quaker City Gas Model Airplane Club will hold a meet at Northeast Philadelphia Airport, Red Lion Road, east of the Roosevelt Blvd., from 10 a.m. to 5p.m. N.A.A. sanction has been obtained. Write Mr. Charles Bossi, Mayfair House, Philadelphia, or Mr. W. S. Berry, 951 East Price Street, Philadelphia, Pa., for entry blanks.

The Bram's Community Service Stores of 4490 Broadway; 41st and Madison and 6th and Washington, Gary, Indiana, are sponsoring three contests for northern Indiana model airplane builders. The contests are: Exhibition, Rubber Powered Endurance, and Gas Model Consistency. For entry blanks write the Bram's stores at any one of the three addresses given above.

The Kazoo Aeronuts Chapter of the Junion N.A.A. will hold a sanctioned gas model contest at Lindbergh Field, Kalamazoo, Michigan, on May 15th, 1938. There will be duration, precision and payload events. Prizes will be given. For entry blank contact Lester Hell, secretary, 507 Mill Street, Parchment, Michigan.

## NOTICE

**It is our earnest desire to please our readers. Therefore we will appreciate it greatly if they will write to the Editor, MODEL AIRPLANE NEWS, 551 Fifth Ave., New York, N. Y., and list the articles in this magazine in the order in which they prefer them.**

**This will help us to determine the type of editorial copy you prefer.**

**The Editor.**



*". . . . Sissy . . . !"*

*Announcing*

# The MADEWELL MITE MOTOR

**A Newcomer in the Small Model Field**
**For Ships with 3 to 4 foot Wing Spread**

After more than a year of research, we now offer a highly developed precision-built motor for the small model plane. It is a marvel of miniature compactness and operating efficiency.

## SPECIFICATIONS:

Bore: 9/16"

Stroke: 9/16"

Weight: Bare, 4 oz., complete flying weight including propeller and 2 penlight cells, 8 oz.

## NOTE THESE ADVANCED FEATURES

- ... Fool-proof Breaker
- ... Controllable Spark Advance
- ... Special 1½ Volt Coil
- ... No Condenser Required
- ... Radial or Shelf Mounting
- ... Easy Starting
- ... Trouble-free Operation
- ... Long Life
- ... Perfect Performance on 2 Penlight Cells

A carefully designed, accurately built, fully tested motor that brings new flight possibilities to the small model plane field. You will be amazed at the power and efficiency we have built into so small, simple, and compact a form.

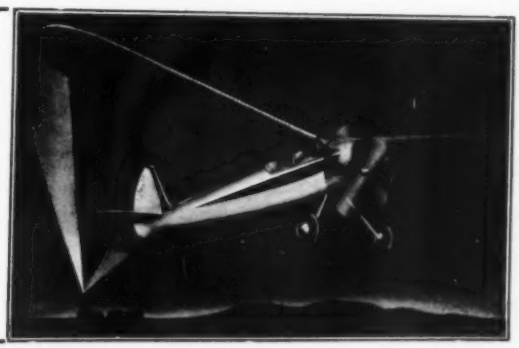
Price complete as shown in illustration mounted on block ready to run, except batteries, postpaid anywhere in United States

**$17.50**

## THE "BUMBLE BEE" KIT

A small, stable, practical ship, designed specially for the small motor, the Bumble Bee has proven itself capable of record-breaking flights. The small size makes it one of the easiest models to transport. Kit includes M and M air wheels, silk covering, readi-cut ribs, bent wire landing gear, plenty of cement and dope, full size blue prints, celluloid, hook-up wire, finished spars, select balsa cut to size, and all needed parts. Specifications: Wing span, four feet; length, 29 inches; weight, 16 ounces, complete with motor. Complete kit $5.00 parcel post or at your dealer.

**SKY DEVIL MODEL SHOP**
**3211 Filbert Street, Oakland, California**



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## MADEWELL MANUFACTURING CO.

*Motor Division*
**1180 25th Avenue**
**OAKLAND, CALIFORNIA**

## SPECIAL OFFER!

We are not in the kit business. However, we have been flying the Bumble Bee (described above) for a number of months and find it suitable for the Madewell Mite Motor. We have made arrangements for a limited number of kits and are making this introductory offer:

| | |
|---|---|
| One Madewell Mite Motor | $17.50 |
| One Bumble Bee Kit | 5.00 |
| Regular value | $22.50 |

**BOTH FOR $21.50 POSTPAID ANYWHERE IN U. S.**

# C-D LOCO PRICE REDUCTIONS!

**For The First Time In The History Of Scale Model Railroading Operating Locomotive And Tender Kits May Be Purchased For Less Than A $10.00 Bill—Buy The Motors When Ready To Operate Them.**

To help you further in getting started in the most popular of all railroad gages, C-D operating locomotive prices have been reduced; made possible by the already overwhelming popularity of the C-D gage—now far greater than our fondest expectations.

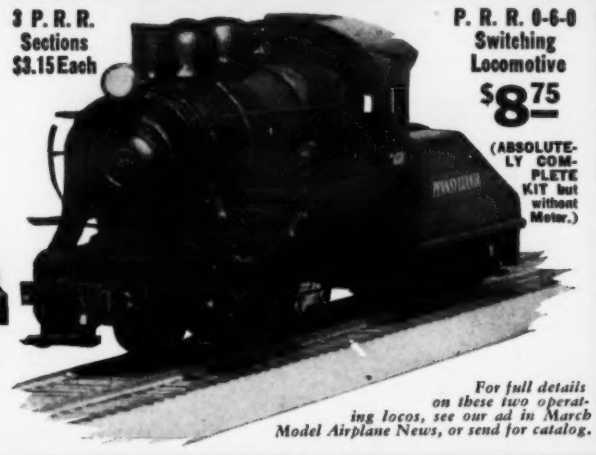
The C.G.W. from $16.95 per complete kit or $4.50 for each of the four sections now reduced to $9.75 or in three sections of $3.50 each for the same exact kit except that motors and reverse switches have been entirely eliminated, so that you may select whichever you wish. An A.C. motor at $3.50 and a reverse switch kit at $.65 may be purchased, or a D.C. motor alone needed, at $3.50 for remote control. For the P.R.R. switcher kit, which originally sold at $14.95 with four sections at $4.00 each may now be had for only $8.75 or $3.15 per each one of the three sections necessary to assemble it completely less motor and reverse switch which may be purchased separately for A.C. operation the motor at $3.00 and reverse switch kit at $.65 or for D.C. remote control operation the motor only is needed at $3.50. Difficult to assemble you ask? They're actually easier than "Reps."

Order one of these locomotives today or a section and get started during the summer time so that you have something to operate soon. Don't let those many idle spring and summer hours slip by when you could enjoy your pleasant workshop surroundings in a cool basement for instance or in any other cool spot which you have undoubtedly picked out for your summer model building work, besides C-D hobbies are not only recreational you know but also educational.

Don't confuse C-D operating with "Rep" Type models.

**3 C. G. W. Sections $3.50 Each**

**3 P. R. R. Sections $3.15 Each**



**P. R. R. 0-6-0 Switching Locomotive**

**$8.75**

**(ABSOLUTELY COMPLETE KIT but without Motor.)**

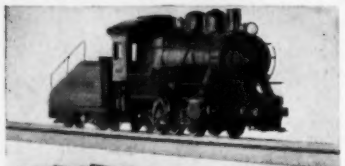
**$9.75**

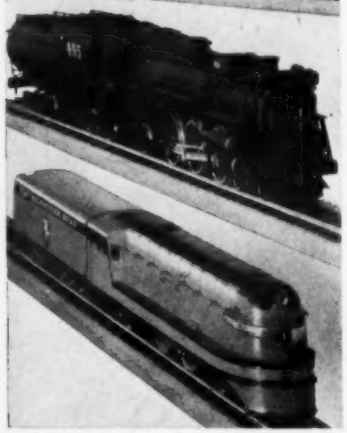
**C. G. W. 4-6-0 MIXED TRAFFIC LOCOMOTIVE KIT (ABSOLUTELY COMPLETE, BUT WITHOUT MOTOR.)**

*For full details on these two operating locos, see our ad in March Model Airplane News, or send for catalog.*

# ONLY 25c-95c for these realistic "REPS"

## —and each Kit contains:





1. All locomotive cabs, tender and car sides, tops and ends completely printed out where possible in original colors, only touching up necessary.
2. Wheels supplied turned, requiring only hand work to complete. They all roll, and locomotive mechanism "works."
3. Necessary bulkheads, truck side frames, etc., printed out.
4. All necessary strips, blocks and pieces to complete the entire locomotive tenders or cars.
5. All fill in materials to simulate the metal or solid wood construction of the prototype.
6. All wire, bond paper, screws, escutcheon pins, axles included, etc., etc.
7. And last, but most important of all, included in each kit is a completely detailed full sized, copyrighted authentic Rep drawing, enabling you to make each model most easily by the easy model design methods worked out.

**This means Kits Are Absolutely Complete—Except Contain NO Liquids. All to 3/16" scale for ¾" C-D gage. Average over all sizes—Locomotives, 12"-17"; Passenger cars, 15"; Box Cars, 8"; height 2½". Kits are complete with sides, tops and ends printed in authentic colors and lettering. By simply adding small weights to the floor of the cars, employing working couplers, detaching dummy trucks and replacing with actual working trucks, all "Rep" (cars only) models may be used in your operating layout.**

**RL-1** PRR Switcher 0-6-0 .65
**RL-2** C&O Pacific (4-6-2) .85
**RS-1** Hiawatha (4-4-2).... .95
**RS-2** Hiawatha Tap-Diner .75
**RS-3** Hiawatha Coach..... .75
**RS-4** Hia. Beaver Tail.... .75

**BOX CARS**

**RB-1** NYC—40 ft. steel.... .45
**RB-2** B&O—40 ft. steel.... .45
**RB-3** B&O—40 ft. wood.... .45
**RB-4** Rock Island 40' wood. .45
**RB-5** Wabash—40' wood.... .45
**RB-6** SP 40' wood furn..... .45
**RB-8** T&P 40' wood auto.. .45
**RB-9** AT&SF—40' wood.... .45
**RB-11** Union Pac—50' st'l .55
**RB-12** AT&SF 50' st. auto .55

**CABOOSE**

**RC-1** PRR type N-5..... .45

**FLAT CARS**

**RF-1** C&NW 46' 50 ton.... .25
**RF-2** PRR 46' 50 ton..... .25
**RF-3** B&M 46' 55 ton..... .25
**RF-4** L&N 46' 50 ton..... .25

**GONDOLA TYPE CARS**

**RG-1** L&N 41' 30 ton..... .35
**RG-2** NYC 41' 50 ton..... .35
**RG-3** MC 41' 55 ton..... .35
**RG-4** T&P 41' 50 ton..... .35
**RG-5** PRR 65' 70 ton mill type gondola..... .55

**55 T. TWIN HOPPER CARS**

**RH-1** CCC&St. L RR..... .40
**RH-2** Missouri Pac. RR.... .40
**RH-3** Southern Railroad.. .40
**RH-4** Illinois Central RR.. .40

**8000 GAL. TANK CARS**

**RT-1** Texaco—TCX (wh.) .35
**RT-2** NATX (black)..... .35
**RT-3** Sinclair8DRX (blk.) .35
**RT-4** Gulf—CRCX (blk.) .35

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